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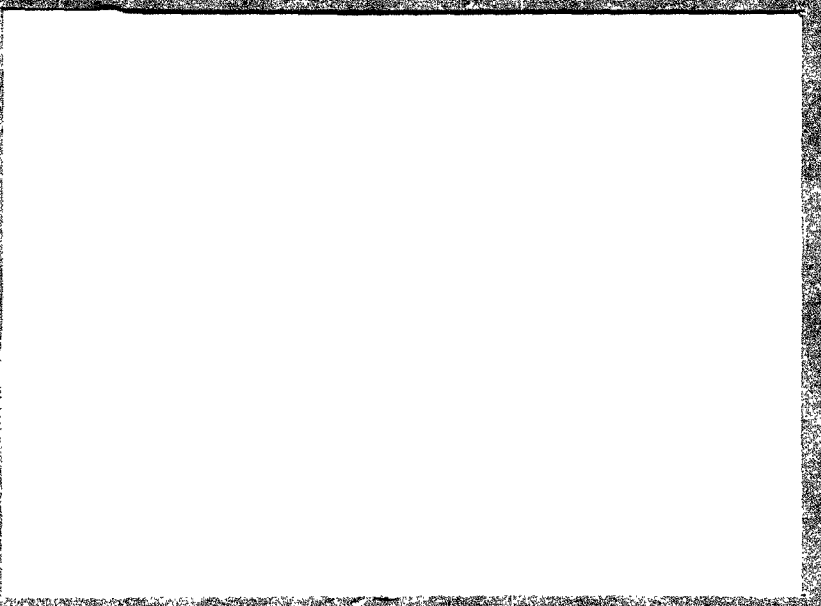

System Sciences

INCORPORATED

EVALUABILITY ASSESSMENT
OF
THE EMERGENCY MEDICAL SERVICES PROGRAM

EXECUTIVE SUMMARY

Prepared Under
Contract #HEW-100-79-0042
Department of Health and Human Services

October 31, 1980

Prepared for

The Office of Evaluation and Technical Analysis
Office of the Assistant Secretary for Planning and Evaluation

and

The Office of Planning, Evaluation and Legislation
Health Services Administration

SYSTEM SCIENCES, INC.
4340 East-West Highway
Bethesda, Maryland 20014
(301) 654-0300

" 'Would you tell me, please, which way I ought to go from here?'
'That depends a good deal on where you want to get to,' said the Cat."

-Alice in Wonderland

ACKNOWLEDGEMENTS

This Evaluabil ity Assessment of the EMS program was completed by a team of System Sciences, Inc. staff professionals—Katharine Robbins, Health Systems Analyst, Jane Morgenstern, Health Systems Analyst, Dave Pederson, Health Systems Analyst, under the guidance of the Project Director.

Mr. Ed Yates of ASP and Mr. Robert Stakes of HSA/OPEL provided assistance and guidance to the System Sciences, Inc. team and participated actively in regular working meetings concerning study design and approaches and presentation methods.

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We are particularly appreciative of the time and perspectives provided by EMS staff at headquarters, the Regional offices and the grantee programs. Dr. David Boyd, Mr. John Reardon, and Mr. Thomas Schibe were helpful in reviewing and commenting on our findings and recommendations.

In such a complex program we could not always reflect the true perspectives of each respondent, but we have tried to present a balanced summary of program objectives, activities, and recommendations in the hope that DHHS, HSA, will find these findings and recommendations useful in their plans for improving program management, analysis and evaluation.

Gerald Sparer
Project Director
System Sciences, Inc.

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INTRODUCTION

This document has been prepared to provide DEMS and other relevant policymakers with a summary of the results of an evaluability assessment of the role of DEMS in administering the EMS program. It describes the findings of the study, suggested management and evaluation options and an assessment of information uses for program managers.

The findings are based upon an eight-month effort consisting of review of EMS legislation, regulations, and other program documentation, interviews with EMS staff at the Central Office and Regional Office levels, and with other key EMS policymakers in the Department of Health and Human Services and elsewhere in the Federal government. In all, more than 40 documents were reviewed, and over 50 interviews were conducted ranging from the Director of DEMS to several state and local staff involved in the program.

The evaluability assessment technique is a specific short-term results-oriented methodology designed to examine a program's operations in terms of program objectives, the plausibility of these objectives, the feasibility of ensuring program accomplishments, and the ability to measure these accomplishments. This is achieve through interviews with (1) program managers within the Federal government, (2) policymakers within the Federal bureaucracy, (3) representatives of Congressional committees, (4) advocacy groups, and (5) site visits to programs operating at the local level.

The methodology required a collaborative effort between program managers, policymakers, and evaluators to assess program operation. All material developed during the course of the study was reviewed by a Work Group representing HSA and ASPE. Briefings with policymakers were held to present potential management and evaluation options and to discuss potential performance measures. The results of this effort may provide the groundwork for a larger, full-scale evaluation or for development of a performance monitoring system.

It is critical that the final products of this evaluability assessment be understandable to EMS policymakers and other HSA and HHS staff, and reflect the kinds of improvements that they feel are desirable and feasible. Therefore, we urge readers of the Final Report and the Executive Summary to review them carefully, particularly the management and evaluation options as briefly outlined in this report and more fully in Chapter V of the Final Report.

I. PROGRAM MANAGEMENT ISSUES--WHITHER EMS?

The fundamental questions about the national EMS program are only important if HSA and the Department believe that the program may have a life beyond the current legislative authority.

The issue of the uncertainty of the life expectancy of the EMS program has plagued it since its inception in 1973. While the program was approved by Congress based on a presumption of positive impact on death and disability, the Administration, OMB, DHHS (DHEW) and HSA staff have regularly attempted to phase it out. This has inhibited any major commitments of staff and funds for program management and evaluation. Such a phase out strategy has also made it difficult for regional programs to recruit and retain top quality staff. A phase out administrative strategy fulfills its own ends; in inhibiting program development and evaluation, the program does not have an opportunity to demonstrate its usefulness and viability.

The administration's view of the program is that at best the federal role is to demonstrate to state and local jurisdictions that such programs are useful. The "seed money" strategy assumes that after five funding cycles the demonstration responsibilities of the federal government ends and local funds should support the EMS programs.

There are two operational problems with this federal approach:

- o The lack of program impact evaluation precludes some regional programs from having the data needed to prove to local officials that the programs can reduce deaths.
- o Some Regional EMS systems develop more slowly than others because of local problems and may need more than five funding cycles to become viable.

Our impression is that the medically and economically disadvantaged areas are having more trouble developing than the medically rich areas. If this is so, then the program will only have enhanced services in the less needy areas, and

will have had less impact on the more needy areas. Such a program outcome would appear inconsistent with HSA, DHHS overall objectives.

Four key decisions are important before HSA can determine a course of action regarding evaluation and management options for the national EMS program:

- o Decision 1

  Should HSA assume that the program should be phased out by 1982 and therefore provide only minimal administrative resources?

- o Decision 2

  Should HSA assume that Congress will keep the program alive and therefore undertake additional evaluation and management analysis to enhance the setting of priorities?

- o Decision 3

  Even assuming that the program will be phased out, should HSA complete the program management cycle by evaluating the program and providing local managers with a documented basis for assessing whether to take over the demonstration?

- o Decision 4

  Should HSA analyze program viability to determine if disadvantaged areas need additional support to complete their EMS system development?

The following sections review the information obtained during the evaluability assessment of the national EMS program. The objectives and logic of the program are discussed; assessments of program reality and information utility are also reviewed. Suggested management and evaluation options are identified. This executive summary is based on a more detailed analytical report which is also available.[1]

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[1] The Office of Evaluation and Technical Analysis, Office of the Assistant Secretary for Planning and Evaluation, HHS and The Office of Planning, Evaluation and Legislation, Health Services Administration, HHS, Evaluability Assessment of The Emergency Medical Services Program--Final Report, Washington, D.C., October, 1980.

II, ASSESSMENT OF MANAGER'S OBJECTIVES AND EXPECTATIONS

A. WHAT ARE THE OBJECTIVES AND EXPECTATIONS OF EMS PROGRAM MANAGERS?

The national EMS program provides grant funds for the development of multigovernmental, multicomnunity comprehensive emergency medical service delivery systems. The regional EMS systems are to be developed through the integration and coordination of the EMS resources in the area. (Chapter II, "The EMS Program" and Chapter III, "Program Objectives," of the Final Report contain detailed descriptions of the history, organization and operations of the EMS program.) During the EA process, a program logic emerged which is shown in Figures II-1 to 11-3.

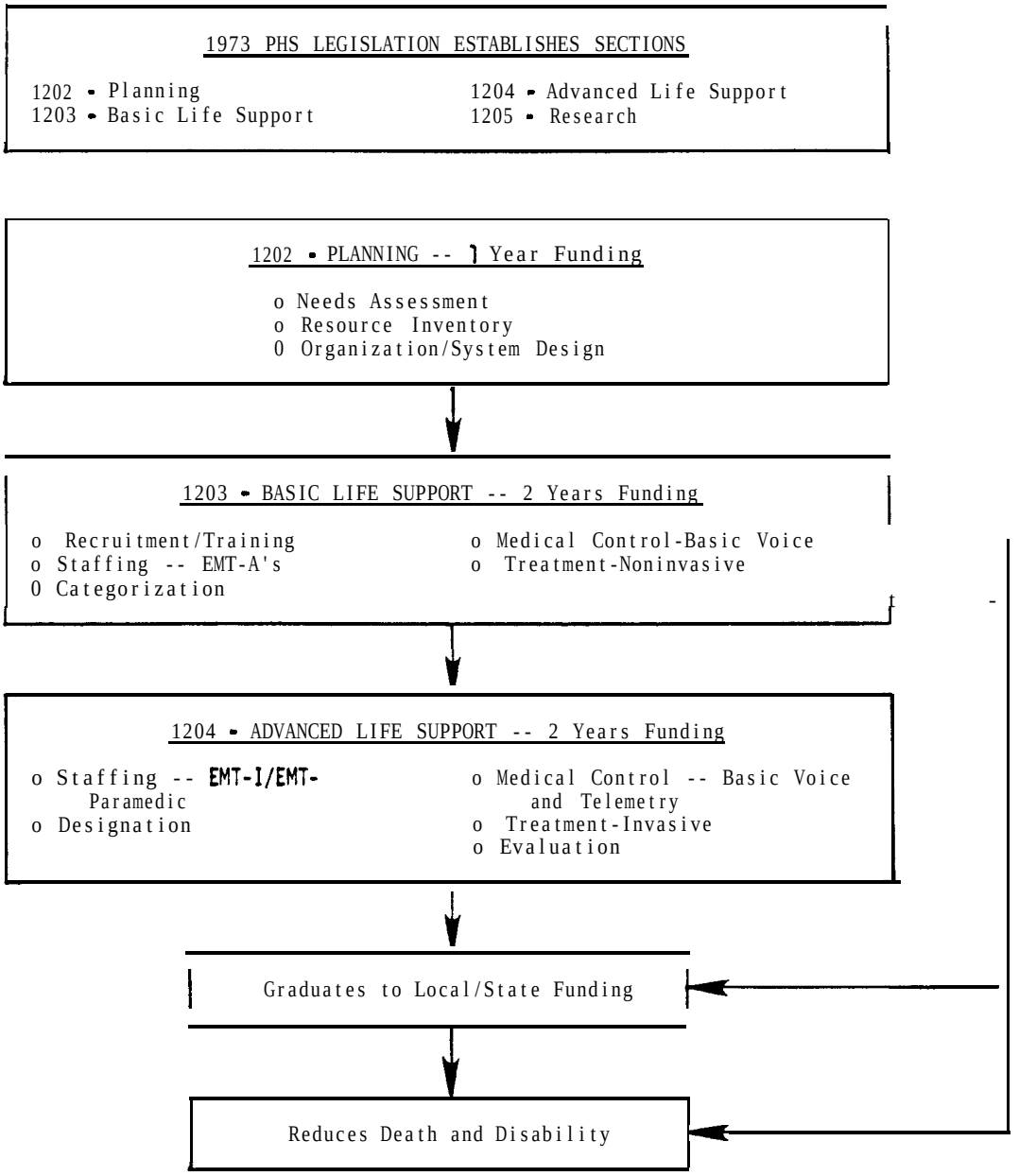
The primary causal assumption for the EMS program holds that: *Developing EMS systems (operational* ***objectives)*** *will* ***Zead to a reduction in death and*** *disability* ***and achievement*** of *financial viability* ***(outcome*** *objectives)*.

A second causal assumption also emerged and is illustrated in the logic models. This assumption holds that: ***Certain*** *system* ***activities relate more*** *directly* ***to the reduction in death and*** *disability*; ***these activities include***: ***manpower and*** *training*; ***communications*** ; ***transportation***: *facilities* ***categorization and*** *designation*; ***and*** *development* of *protocols* and ***wreements.***

The questioning of respondents about the *major objectives* for the EMS program revealed three different, though related, areas of focus:

- o The reduction of death and disability due to emergency medical episodes (outcome objective),
- o Development of a national network of financially viable EMS systems through the provision of federal "seed" monies (outcome objective),
- o EMS system development and implementation in component and critical care areas (operational objectives).

EMS BUDGET AND LEGISLATIVE LOGIC MODEL



EMS PROGRAM COMPONENTS

Manpower
Training
Communications
Transportation
Facilities (categorization)
Critical Care Units (capacity)
Public Safety Agencies
Consumer Participation
Access
Patient Transfer
Recordkeeping
Consumer Information
Independent Evaluation
Disaster Linkage
Mutual Aid Agreements

EMS Program Critical Care Areas

Trauma
Burn
Spinal Cord
Neonate
Acute Cardiac
Poisoning
Behavioral

FIGURE II-1

LOGIC MODEL

EMS SYSTEM DEVELOPMENT AND IMPLEMENTATION

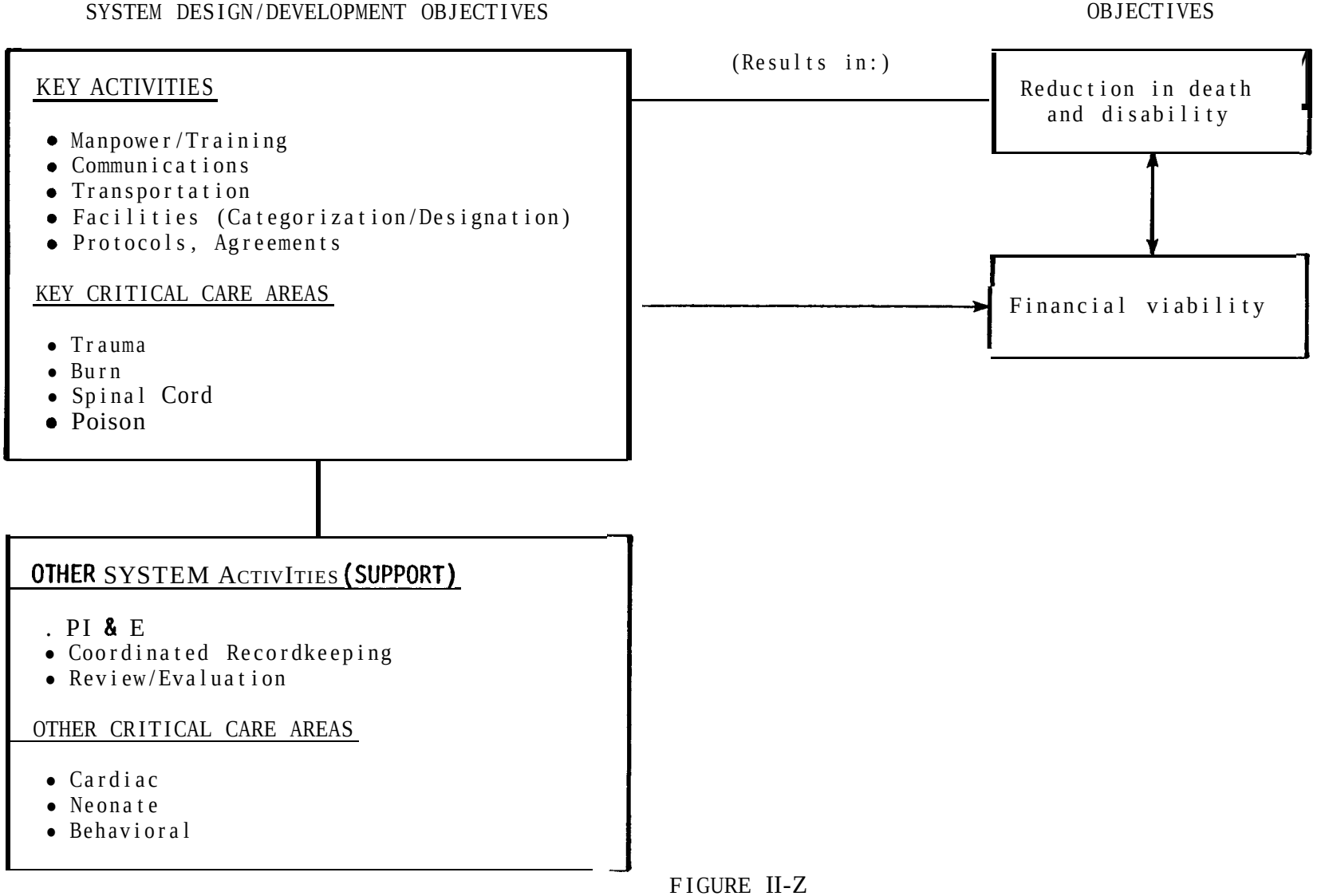


FIGURE II-Z

EMS PROGRAM MANAGEMENT

FUNCTIONAL MODEL

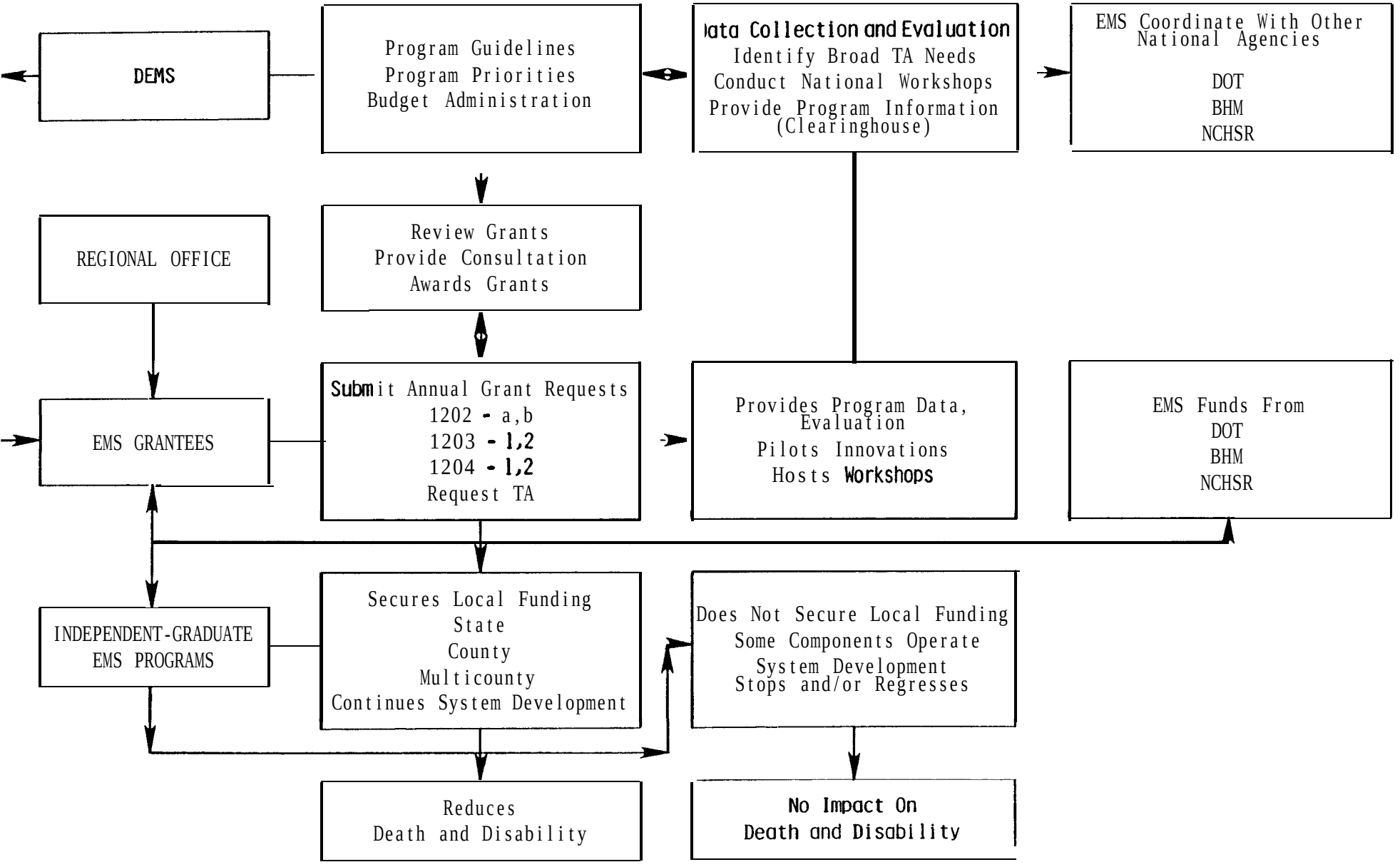


FIGURE II-3

B. DO THOSE ABOVE THE DIVISION OF EMERGENCY MEDICAL SERVICES (DEMS) AGREE WITH ME INTENDED PROGRAM'

During the EA interviews, project staff elicited information on the respondents' understanding of the program as well as on what each respondent perceived as the major objectives of the EMS program. Figure II-4 provides a summary of the understanding of the EMS program evidenced by representatives at different levels. In most instances, detailed knowledge about the program was found at the level of DEMS and below. At the level above DEMS, only limited or general awareness was found.

Figure II-5 illustrates how each of those interviewed perceived the objectives for the EMS program. From a review of this matrix, the following points emerge:

- o At the levels above DEMS, the major objectives for the EMS program are perceived to be the reduction of death and disability and the development of financially viable systems.
- o At the levels of DEMS and below, these same objectives are perceived. However, greater emphasis and priority was often given to the achievement of operational objectives. This was especially true as project staff proceeded in interviews from the level of DEMS down to the individual EMS systems.

Chapter IV, "Assessment of Perceived Program Objectives," reviews in greater depth the information obtained about the program managers' perceptions.

C. DOES DEMS HAVE MEASURES FOR THE INTENDED PROGRAM? WHAT ARE THE DATA SOURCES FOR PROSPECTIVE MEASURES DEVELOPED BY DEMS?

As noted, the intended program has three major objectives:

- o Reductions in death and disability;
- o Development of a network of financially viable systems; and
- o System development and implementation.

PROGRAM UNDERSTANDING

	15 Components	Critical Care Areas	Financial Viability (Seed Money Strategy)	Reporting/ Information Available	Program Issues
QUESTION	Are respondents familiar with program requirements in the 15 component and critical care areas?		Are respondents familiar with the aeed money strategy for the EMS program?	Are respondents aware of the data available (Oh lack of it) on EMS programs?	Are respondents familiar with the issues in EMS?
Congress	Limited	Limited	Limited	Limited	Limited
OMB	Limited	Limited	Specific Interest	Limited	Limited
HHS	Limited	Limited	Limited	Limited	Limited
PHS	Limited	Limited	Specific Interest	Limited	Limited
HSA	Limited	Limited	Specific Interest	Limited	Limited
BMS/DEMS	Detailed	Detailed	Detailed	Detailed	Detailed
RO	Detailed	Detailed	Detailed	Detailed	Detailed
REMS	Detailed	Detailed	Detailed	Detailed	Detailed

KEY: Detailed -- Knowledge of program objectives, activities, issues.

Specific Interest -- General knowledge of program objective, specific interest in issue, little knowledge of activities.

Limited -- Little knowledge of program objectives, activities, issues.

FIGURE II-4

PROGRAM OBJECTIVES

ECHELON	RANKING OF PROGRAM OBJECTIVES
Congress	1. Reduction in death and disability, 2. Achievement of network of financially viable systems.
OMB	1. Achievement of network of financially viable systems.
HHS and PHS	1. Reductions in death and disability. 2. Achievement of network of financially viable systems.
HSA	1. Reduction in death and disability. 2. Achievement of network of financially viable systems.
BMS and DEMS	1. Reduction in death and disability. 2. System development and implementation (operational objectives). 3. Achievement of network of financially viable systems.
Regional Office	1. Reduction in death and disability. 2. System development and implementation (operational objectives) 3. Achievement of financial viability.
EMS Systems	1. System development and implementation. 2. Achievement-of financial viability. 3. Reduction in death and disability.

FIGURE II-5

Measures of reductions in death and disability are being researched and developed. The measures of reductions in death and disability are not, as yet, completely agreed upon. However, previous efforts and on-going research have contributed to the emergence of some methodological approaches which provide a means of evaluating system impact. The assessment of the trauma system is felt to provide an adequate and reliable indication of overall system performance. The analysis of outcomes (lived/died) coupled with the analysis of injury severity is one way of measuring system performance. In addition, the analysis of compliance is perceived as an adequate means of assessing the systems' ability to reduce deaths. Compliance analysis involves tracking patients with specified injuries through the EMS system and reviewing whether patients are being moved to facilities most appropriate for the treatment and management of the patients' injuries.

Trauma impact studies require a variety of data sources. To date, consistent and comparable data has been difficult to compile. It has been acknowledged that continued efforts are needed in designing data systems and in assessing already available data systems.

Measures of systems' financial viability have been given only limited attention and warrant further investigation. The measures of systems' financial viability are lacking a broad base of agreement. In general though, some measures appear to be gaining acceptance; these measures involve examining the ratios of hard to soft matches and the proportions of the budget expenditures allocated to different system activities. Hard matches are those funds committed on a recurring basis; increasing amounts of hard matches are perceived as an adequate indication of the increasing financial viability of the system. Figure II-6 illustrates the ratios which can serve as measures of systems' financial viability.

The greatest success in developing measures of the intended program has related to system development and implementation. Structure, process and performance measures exist and, in general, are accepted as valid and reliable measures. Figure II-7 presents examples of some of the key structure, process and performance measures which have been developed.

MEASURES OF EMS SYSTEMS' FINANCIAL VIABILITY

RATIOS OF:

- Percentage of annual budget provided by DEMS
- To, percentage of annual budget provided by state, county or local government.

- Percentage of annual budget provided by "hard" matches
- To, percentage of annual budget provided by "soft" matches.

- Percentage of DEMS grant funds expended for administration and staffing
- To, percentage of these costs covered by state, county or local government.

- Percentage of budget/expenditures by category (Administration; Communications; Categorization; Training, etc.)
- To, total budget/expenditures.

FIGURE II-6

EXAMPLES OF KEY STRUCTURE, PROCESS AND PERFORMANCE MEASURES

MANPOWER/TRAINING

STRUCTURAL MEASURES	PROCESS MEASURES	PERFORMANCE MEASURES
• Listing of programs available • Existence of formal certification/ re-certification/de-certification process	• Number and percent trained personnel by type • Percent of need met by type • Number, percent, type certified/re-certified/decertified per year	• Number, percent of facilities with 'I-day, 24-hour EMS delivery • Number, percent ambulance runs with at least: - BLS - 2 EMT-A's - ALS - 2 EMT-I or EMT-P

TRANSPORATJON

STRUCTURAL MEASURES	PROCESS MEASURES	PERFORMANCE MEASURES
. Existence of placement strategy . Types, number and percent of EMS vehicles meeting national specifications • Number, percent of ambulances with essential equipment	• Proportion of population within: - 30 minutes, maximum - rural - 6-8 minutes, average - urban • Number, percent EMS transports in vehicles meeting national specifications • Number, percent ambulance runs with essential equipment	. Number, percent of EMS vehicle runs with response times of - in rural areas - maximum of 30 minutes - in urban areas - average of 6-8 minutes

FACILITIES CATEGORIZATION AND DESIGNATION

STRUCTURAL MEASURES	PROCESS MEASURES	PERFORMANCE MEASURES
• Existence of verticle and horizontal categorization plans	• Type, number and percent of facilities categorized and designated • Type, number and percent of facilities not categorized	• Number, percent of patients matched with appropriate facility (compliance) by critical care area

FIGURE II-7

Focus has been on the measures of the development/implementation of the components, especially on those components which are viewed as relating most directly to patient access and service delivery. These components are: manpower/training; communications; transportation; facilities categorization and designation; and protocols and agreements.

System development and implementation is measured not only through the analysis of the components but also through the analysis of the critical care areas. The critical care area receiving the greatest attention is trauma. It was repeatedly stressed that the greatest and most measurable impact of the EMS program will be in the management and treatment of trauma patients.

Data on structure, process and performance for the component and critical care areas has been collected from a variety of sources. Reporting of such data has been provided in the annual grant applications and evaluation abstracts. A new reporting system--the Regional Emergency Medical Management Information System (REMMIS)--has recently been developed by DEMS. Implementation of REMMIS will take the agreed upon measures of system structure, process and performance. Chapter IV of the Final Report discusses key structure, process and performance measures included in REMMIS.

III, ASSESSMENT OF PROGRAM REALITY

A. IS DEMS'S DESCRIPTION OF THE INTENDED PROGRAM A SOUND REPRESENTATION OF THE PROGRAM IN THE FIELD?

The DEMS's description of the intended ENS program in terms of activities and outcomes was found to be a sound representation of the program in the field. Varying types of EMS system configuration are allowed for and encouraged by DEMS; systems do in fact evidence a great range and variety in structure, financial and developmental history, configuration (urban/rural etc.) and staff size.

In general, all systems evidenced congruence with the orientation and objectives of the intended program. Systems address and give emphasis to different component and critical care areas depending on a variety of factors. Stage of development (3202, 3, 4), funding history, resources in place, staff capacity, political climate, are just some of the factors influencing the varying characters of the individual systems. This variety is accounted for in the DEMS description of the intended program.

Systems evidenced agreement with the intended objectives for the program although a re-ordering in emphasis and priority was found. For EMS systems, the immediate and primary objectives logically centered on system development, implementation and operation. Achievement of financial viability was given next priority. Reduction in death and disability was viewed as a longer-range outcome objective. This contrasts with the DEMS ordering of program objectives. (See Figure 11-5). However, the difference in emphasis evidenced between the EMS systems and DEMS has not had major negative implications for the programs' implementation and operation. Rather, it has meant that information requirements and uses have been different for DEMS and the EMS systems as each seek data on the extent to which stated objectives are being realized. (This will be discussed below in Section IV).

B. ARE THE ACTIVITIES TAKING PLACE LIKELY TO REALIZE DEMS OBJECTIVES FOR THE PROGRAM?

More extensive testing of the EMS programs' overall plausibility should be undertaken. The link between EMS systems development and reductions in death and disability has not been adequately established. In addition, from the review of EMS documents and the interview summaries, it appears that the seed money strategy may be implausible for some programs in that sufficient progress has been difficult to achieve within the five year funding cycle. The EA process also revealed that certain activities are somewhat difficult to define or describe with any specificity and are more remote in influencing achievement of program objectives. The plausibility of these activities remain open to question; an example of such an activity would be consumer participation: Measurement of actual participation could be taken but the subsequent measurement of the influence of such activity would be impractical and difficult.

A more definitive view of the EMS program plausibility will be supported by the evaluation options.suggested. These options are reviewed briefly below and in more depth in Chapter V--Assessment of Program Information Needs and Analysis Options--of the Final Report.

IV, ASSESSMENT OF INFORMATION UTILITY

A. WHAT ARE ME QUESTIONS OF MOSE ABOVE DEMS CONCERNING ME EMS PROGRAM? MOW WOULD INFORMATION ON THE ANSWERS TO THESE QUESTIONS BE USED?

In the levels above DEMS, questions about the EMS program relate to the extent to which the program is realizing the intended objectives of reducing death and disability and development of a network of financially viable EMS systems. Questioned is whether or not EMS system development has significantly influenced the rates of deaths and disability. Most often this question was asked in conjunction with another: Are EMS systems reducing death and disability rates and at what cost to the Federal government? It was often noted that insufficient attention was given to the questions about the financial viability of the EMS systems and that additional information would help to inform any discussions about the EMS program.

Information about these two aspects of the EMS program could be used in the debates about a variety of issues related to the national EMS effort. Information on the association between system development and reductions in death and disability will assist policy-makers and program managers in shaping any decision about any future for the EMS program. Information on the financial viability of EMS systems will also contribute to an enhanced decision-making process in reference to the future of EMS. Such information would be used in re-opening the debate about the future of EMS, it would also allow for a re-evaluation of the character and orientation of the program. Information on the following questions would provide an indication of where change or modifications in the existing program are needed:

- o How many EMS systems which have graduated are now financially viable?
- o How many systems have not been able to achieve sufficient progress towards financial viability?
- o Where are these systems located? (underserved areas? rural?)

If in fact, debate about the future of EMS is moot, then such information would be of limited utility. However, in general, most respondents felt that EMS would be refunded (though, perhaps, at increasingly lower dollar levels). It was recognized that information on program impact and on the extent to which financially viable systems have or have not been developed (and where these are located) would aid all decision making.

B. WHAT ARE ME QUESTIONS OF DEMS CONCERNING THE EMS PROGRAM? HOW WOULD INFORMATION ON THE ANSWERS TO THESE QUESTIONS BE USED?

For DEMS, the program information needs and questions have three general areas of focus: program impact (Is the EMS program reducing death and disability?); programs' financial viability; and, system's progress in development and implementation. Figure IV-1 provides a brief summary of some of the key questions of DEMS personnel.

Answers and information on these questions will be used by DEMS for a variety of purposes:

- Program administration and management -- to include technical assistance and feedback.
- Program financial management -- to include analysis of financial viability and component/critical care area costs.
- Program justification -- to assist in efforts at Congressional, State, County and local levels.

C. WHAT ARE THE QUESTIONS OF THE EMS SYSTEMS ON THE EMS PROGRAM? HOW WOULD INFORMATION ON THE ANSWERS TO THESE QUESTIONS BE USED?

EMS systems managers have questions about a broad spectrum of issues and topics. The link between EMS system development and reductions in death and disability is commonly accepted by system managers. However, resistance to increasingly sophisticated system design and development is often encountered. To offset such resistance, EMS system managers need more information on the association between system development and reductions in death and disability.

MATRIX OF DEMS

INTENDED PROGRAM OBJECTIVES, PROGRAM INFORMATION NEEDS AND QUESTIONS

Intended Program Objectives	DEMS Program Information Needs and Questions	Information/Data Services
• Reductions in death and disability	Are reductions in death rates being effected by the national EMS program?	• Recent impact and evaluation studies.
	• What is the impact of trauma system development and implementation?	
	• Are changes in death rates occurring in systems without designated trauma centers?	
	. What percentage levels of compliance are acceptable? (Trauma patients live/die in trauma/non-trauma center)	• Unknown
• Financial viability	What progress is being made to assure that individual EMS systems will be financially viable when Federal funding is completed?	• Grants/Abstracts - Never fully summarized
	• What percentage of the annual budgetisprovided by DEMS? State? Local?	
	• What percentage of each annual match is hard? Soft?	
	• What percentage of grant funds are used for administration and staffing?	
	• What are the costs associated with the components of manpower/training, transportation, communications, facilities (categorization/designation)?	• Unknown
	• What are the costs associated with development implementation of the critical care plans? (ex. trauma)	• Unknown
	• What percentage of the budget is provided by other agencies?	• Unknown
• System Development and Implementation	Are the EMS systems being developed and implemented performing adequately?	• Grants/Abstracts - Never fully summarized
	• What percentage of facilities have 7-day, 24-hour EMS delivery? What percentage are designated?	
	• What are the staffing levels on ambulance runs?	
	• What are EMS transport response times?	
	• What percentage/area of population is covered by 911? Has central dispatch been implemented? Is medical control available?	
	• Are protocols, transfer and mutual aid agreements formalized and in use?	

FIGURE IV-l

It was noted that three types of information could prove useful:

- o Information on the achievements of other EMS systems in reducing death and disability;
- o Information on the local need for better EMS services; or
- o Information on the achievements of the local EMS system in reducing death and disability.

Information from national and/or more localized studies would be used by managers in their efforts to obtain greater financial, political and medical support.

Managers have questions about their own systems' performance and progress. These questions focus on the extent to which the system is functioning efficiently and effectively. Monitoring the on-going activities of the systems' operations provides managers with a basis upon which to make sound administrative decisions or changes.

System managers also have questions about the other EMS systems. Sample questions are:

- o Has a particular strategy worked in categorizing and designating facilities?
- o What have been the costs associated with certain of the components?
- o Does a particular communications system work effectively?

Case studies and regional workshops would be used by EMS managers for the sharing of information of issues, problems and successful efforts. Technical assistance documents would also contribute to enhanced system management.

V. SUMMARY

A. WHAT PORTION OF ME PROGRAM IS READY FOR EVALUATION OF PROGRESS AGAINST AGREED-UPON OBJECTIVES?

Figure V-l summarizes what portions of the EMS program which are ready for evaluation against the different objectives.

B. WHAT EVALUATION/MANAGEMENT OPT1 ONS SHOULD BE CONSIDERED?

Figure V-2 lists the suggested evaluation and management options. Each of these recommendations is discussed in greater detail in Chapter V of the Final Report. A brief summary of the scope of each suggestion is provided below.

- Trauma Impact Studies -- To analyze outcomes associated with trauma system implementation. To include an evaluation of whether or not trauma center designation is an effective mechanism for reducing deaths.

- Program Financial Analysis -- To monitor and assess system financial viability. To include an analysis of expenditures by categories and the assessment of key ratios (hard to soft matches, etc.).

- Program Performance Analysis -- To monitor system performance against structure,process,and performance objectives.

- Funding Strategy Development -- To address program priorities which would be developed under varying levels of funding and under varying assumptions about the life of the program.

- Targeted Technical Assistance -- To provide grantees with additional indepth information on effective communication technologies; model enabling legislation and coordinated data reporting/analysis systems.

- Interagency Coordination -- Efforts to improve coordination between those federal agencies with an EMS component. Increased linkage between DEMS, the Department of Transportation, National Center for Health Services Research and Bureau of Health Professions.

PORTIONS OF THE EMS PROGRAM READY FOR EVALUATION AGAINST AGREED-UPON OBJECTIVES

INTENDED OBJECTIVE	Portion of the EMS Program Ready for Evaluation Against Specified Objective	Evaluation Option
Reductions in Death and Disability	1204(2) -- EMS Systems Graduated Systems	Trauma Impact Studies
Financial Viability	1203(2) -- EMS Systems 1204(1) -- EMS Systems 1204(2) -- EMS Systems Graduated Systems	Program Financial Analyses— REMMIS
System Development and Implementation	All systems past the level of 1202	Program Profiles— REMMIS

FIGURE V-1

SUGGESTED EVALUATION OPTIONS

- o Trauma Impact Studies
  - Compliance/Longitudinal
  - Cross-sectional
- o Program Profiles Using Agreed-Upon Selected Measures of Program Structure, Process and Performance
  - REMMIS
- o Budget Expenditure Profiles

SUGGESTED MANAGEMENT OPTIONS

- o Funding Strategy Development
- o Targeted Technical Assistance
  - Communications
  - Model Legislation
  - Program Reporting
- o Interagency Coordination

FIGURE V-2

EVALUAB I LI TY ASSESSMENT

OF

THE EMERGENCY MEDICAL SERVICES PROGRAM

for

The Office of Evaluation and Technical Analysis
Office of the Assistant Secretary for Planning and Evaluation

and

The Office of Planning, Evaluation and Legislation
Health Services Administration

Department of Health and Human Services

Contract #HEW-100-79-0042

FINAL REPORT

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SYSTEM SCIENCES, INC.
4340 East-West Highway
Bethesda, Maryland 20014
(301) 654-0300

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15. Supplementary Notes

16. Abstracts

In conducting the evaluabilit yassessment of the Emergency Medical Services (EMS) progra, the evaluation team found that: (1) Agreement on the intended EMS program was found to exist. Varying degrees of emphasis both above and below the Dividiosn-of EMS were given to the perceived program objectives. In general though, three objectives were articulated: a) the reduction of death and a disability due to emergency medical episodes (outcome objective); b) development of a national network of financially viable EMS systems (outcome objective);. c) development through provision of federal "seed monies; and d) system development and implementation (operational objective). 2) A program logic emerged which had as its foundation two primary causal assumptions: a) developing EMS systems (operational objective) will lead to a reduction in death and disability and achievement of financial viability (outcome objective); b) certain system activities relate more directly to the reduction in death and disability; the activities include: manpower and training, communications, transportation, facilities categorization and designation and development of protocols and agreements. A sizable portion of the program ready for the evaluation of progress against agreed upon objet-tives.

17. Key Words and Document Analysis. 17a. Descriptors

17b. Identifiers/Open-Ended Terms

17s. COSATI Field/Group

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EVALUABILITY ASSESSMENT OF THE
EMERGENCY MEDICAL SERVICES (EMS) PROGRAM

ABSTRACT

The Emergency Medical Services System Act (P.L. 93-154) enacted in 1973, mandated the provision of federal funds for the development of emergency medical services systems. In conducting an evaluability assessment (E.A.) of the Emergency Medical Services (EMS) program, the evaluation team found that:

1. Agreement on the intended EMS program was found to exist. Varying degrees of emphasis both above and below the Division of EMS (DEMS)were given to the perceived program objectives. In general though, three objectives were articulated:

   - o The reduction of death and disability due to emergency medical episodes (outcome objective);
   - o Development of a national network of financially viable EMS systems (outcome objective); development through provision of federal "seed" monies.
   - o System development and implementation (operational objective).

2. A program logic emerged which had as its foundation two primary causal assumptions:

   - o Developing EMS systems (operational objectives) will lead to a reduction in death and disability and achievement of financial viability (outcome objectives);
   - 0 Certain system activities relate more directly to the reduction in death and disability; the activities include: manpower and training, communications, transportation, facilities categorization and designation and development of protocols and agreements.

3. The activities prescribed for the realization of program objectives are well specified in the document of Program Guidelines. Such activities require developing EMS systems to address 15 components and seven critical care areas as well as provision of matching funds. Achievement of some of the prescribed activities has been inconsistent and uncertain.

4. Agreed upon measures for certain aspects of the intended program exist. Measures of system structure, process and performance have been developed. Measures of system impact and financial viability warrant further attention.

5. Descriptions of the intended program are a limited representation of the program in the field. Those programs which have received the full five years of federal funding and which have attained significant state, county and local government support are partially representative of the intended program. Programs at earlier levels of development are not.

   The advanced or graduated EMS systems are not as sophisticated or broad as the intended program. These programs are narrower in that only certain components and critical care areas are being given attention.

6. Most of the prescribed EMS program activities appear to be positively associated with the realization of program objectives. Certain activities appear to be of greater influence than others. The linkages between program activities and outcomes need to be more aggressively tested to establish the plausibility of both the prescribed activities and the anticipated outcomes.

7. DEMS management would use information on program performance to monitor the administration of grant funds, to evaluate system performance, provide feedback to the EMS systems and to the echelons above DEMS.

8. A sizable portion of the program is ready for the evaluation of progress against agreed upon objectives. Those programs in the later stages of the funding cycle (1203-2, 1204-1, 1204-2) and having graduated, are ready for evaluation.

9. Program management should consider the following evaluation and management options:

   - o Impact Studies,
   - o Financial viability analyses,
   - o Structure, process and performance analyses,
   - o Funding strategy development,
   - o Targeted technical assistance,
   - o Interagency coordination.

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I, THE PROJECT -- EVALUABILITY ASSESSMENT OF THE EMERGENCY MEDICAL SERVICES SYSTEM (EMSS)

A. PROJECT OBJECTIVES

The Evaluability Assessment (EA) of the Emergency Medical Services System was an eight-month study effort performed by System Sciences, Inc. a private consulting firm in Bethesda, Maryland. The Office of Evaluation and Technical Analysis, Office of the Assistant Secretary for Planning and Evaluation (ASPE), HHS collaborated with the Office of Planning, Evaluation and Legislation (OPEL) and the Division of Emergency Medical Services (DEMS), Health Services Administration, HHS, in providing project guidance and administrative support.

Evaluability assessment is a methodological approach which can be used to determine the extent to which a program is evaluable. The process describes the extent to which managers and policy-makers have defined measurable program objectives, assesses the plausibility of program objectives and the feasibility of measuring progress toward program objectives. Also examined are the availability of, and the defined specific uses for information on program performance. Evaluability assessment aids in the identification of opportunities for change in program activities, objectives and uses of information which could lead to improved program performance. In addition to providing such management options, evaluability assessment can be used to develop evaluation options for appropriate managers and policy makers.[1]

Five major project tasks were required for this project effort:

- o Documentation of the intended program at all levels to include: managers' and policy-makers expectations for program activities

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[1] Joseph S. Wholey, Evaluation: Promise and Performance, Washington, D.C., The Urban Institute, 1979.

and accomplishments; agreed-upon measures; data sources and availability; and intended uses of program information.

- o Documentation of actual program activities and results.
- o Identification of the key variables that influence the achievement of EMSS program goals; identification of key actors and entities influencing the achievement of program goals; and identification of key leverage points which are potentially sensitive to change.
- o Development of a preliminary set of program performance indicators related to national EMSS program goals.
- o Formulation of management and evaluation options for the EMSS program.

B. PROJECT METHODOLOGY

1. Document Review

The System Sciences, Inc., project team began the process of the evaluability assessment by obtaining, reviewing and analyzing documents and literature related to the EMSS program. The documents included: legislation; rules and regulations; program guidelines and technical assistance documents; research project reports and abstracts; as well as articles from a variety of journals.

2. Working Group, Policy Group Formation

Formation. of a Working Group and Policy Group took place while the literature review was in progress. Members of the Working Group included the System Sciences, Inc. project staff, Mr. Ed Yates of ASPE, and Mr. Robert Stakes of OPEL. The Working Group, meeting approximately every three weeks was responsible for the planning, reviewing, and implementation of the project activities.

The Policy Group was made up of representatives from government agencies concerned with the national EMS program activities: Dr. David Boyd,

Director, DEMS; Dr. Lawrence Rose, Chief, Institutional Care/EMS/Long Term Care Cluster, NCHSR; Mr. Ron Carlson, Director, OPEL; Dr. William Gemma, Assistant Administrator for International Affairs, HSA; and Mr. Samuel Seaman, Director of Health Resources, Office of the Assistant Secretary for Health.

3. Interviewing

In order to document the intended programmatic objectives and to identify expectations and causal assumptions, interviews with key representatives in the variety of Federal agencies having some EMS concerns were completed by the project staff. Figure I-l provides a list of those interviewed. Key staff of the DEMS office were interviewed as were representatives from DOT, OMB, the Congressional appropriation and authorizations committees, NCHSR and the Office of the Director, Health Services Administration. During these interviews, a set of standardized questions were asked by the project team members. Additional questions were tailored to each interview to elicit more detailed program information. Complete sets of notes were taken to record the comments and suggestions given.

4. Initial Program Modeling

Logic, function and implementation models of the EMSS program were developed to graphically depict the intended program activities, objectives and outcomes. These models were based on the literature review and the set of interviews with national, regional and local program managers and policymakers. Preliminary measurement and impact models were also developed for certain components of the EMS program. These models (contained in Appendix A) were initially presented to the Policy Group for their review and comment.

5. Site Visits

An important step in the EA process is site visiting local programs to determine the extent to which "congruence" exists between objectives articu-

EMS EXPLORATORY EVALUATION

INTERVIEW LIST

NAME	TITLE
EMS	
Dr. David Boyd	Director
Mr. John Reardon	Deputy Director
Mr. Dick Salamandre	Chief, Operations Branch
Mr. Tom Schieb	Evaluation Specialist
Mr. Lee Schuck	Liaison, Workshop Coordinator
Mr. John Wood	Communications Specialist
HSA	
Mr. Bill Aspen	
Dr. Leon Cooper	Special Assistant to Dr. Lythcott
Dr. William Gemma	Asst. Admin. for International Affairs
Mr. John Kelso	Deputy Administrator
BHP	
Mr. Earl Murphy	Division of Medicine, Bureau of Health Professions, EMS Training
BMS	
Dr. Vivian Chang	Deputy Director
NCHSR	
Dr. Lawrence Rose	Chief, Institutional Care/EMS/Long-Term Care Cluster
Ms. Elinor Walker	Research Specialist
OPEL	
Mr. Ron Carlson	Associate Administrator
OMB	
Mr. Lee Mosedale	Budget Examiner for HSA
SENATE	
Mr. Terry Lehrman	Chief Clerk, Senate Appropriations Committee
Ms. Louise Ringwalt	Subcommittee on Health and Scientific Research

FIGURE I-1

EMS EXPLORATORY EVALUATION

INTERVIEW LIST (CONTINUED)

NAME	TITLE
HOUSE	
Mr. Mike Stephens	Appropriations Committee
HHS	
Mr. Chris Bladen	Evaluation in ASPE
Ms. Phyllis Zucker	ASH, Office of Planning and Evaluation

FIGURE I-1 (continued)

lated by those at the national level and the objectives of the local programs. Site visits represented a "reality-check" in that actual program activities, objectives and outcomes could be documented through interviews with key local program staff and review of local program documents.

Programs selected for site visits were chosen on the basis of suggestions from DEMS and NCHSR staff. A mix of programs was sought; programs which had "graduated" through the Federal funding cycle were visited as were programs at an earlier stage of development. Programs in states with a strong state lead agency were visited and programs in a state with little or no state input were also visited. The group of programs visited was in no way meant to be statistically significant. Rather, a broad spectrum of characteristics were used as variables in arriving at the choice of sites. Programs evidenced a great range and variety in structure, financial and developmental history, configuration (urban/rural, etc.) staff size and orientation.

The listing of sites visited is contained on the following page. Also visited were the PHS Regional Offices administratively responsible for the programs selected (Atlanta, Philadelphia, San Francisco). Brief site visit reports are available in Appendix B which provide overviews of the individual programs.

EMSS EVALUABILITY ASSESSMENT

SITE VISITS CONDUCTED

The Maryland Institute for Emergency Medical Services (MIEMSS)
Baltimore, Maryland

The Inland Counties Emergency Medical Authority (ICEMA)
San Bernadino, California

The Orange County Emergency Medical Service
Santa Ana, California

The West Alabama Emergency Medical Services System
Tuscaloosa, Alabama

The Birmingham Regional Emergency Medical Services System (BREMSS)
Birmingham, Alabama

The Southeastern Alabama Emergency Medical Services System
Montgomery, Alabama

The Alabama State EMS Agency
Montgomery, Alabama

PHS Offices

Philadelphia
San Francisco
Atlanta

II, THE EMS PROGRAM

A. LEGISLATIVE AND BUDGET HISTORY

This section presents a brief history and description of the major legislative initiatives related to emergency medical systems and traces EMS funding levels and grant awards for Fiscal Years 1974 through 1979.

1. Highway Safety Act of 1966

The Highway Safety Act was signed into law on September 9, 1966, by President Johnson. Under this act, the Federal Highway Administration was given the responsibility to develop and administer safety standards related to highway and traffic safety. All states were expected to have in operation federally approved programs in compliance with the standards issued by the Secretary of Transportation. The Highway Safety Act recognizes the importance of prehospital emergency medical services by requiring that highway safety standards include coverage of such services. The Department of Transportation implemented this requirement through Standard Eleven, which provides for a prehospital emergency care system and requires that each State shall undertake certain activities, including:

- o The training and licensing of ambulance and rescue vehicle operations.
- o The development of standards for the types, numbers and supplies to be carried by an emergency attendant for the operation of ambulances.
- o The development of first aid training programs for prehospital emergency service personnel and encouragement of the, general public to take such courses.
- o The development of criteria for the use of two-way communications for prehospital EMS systems.
- o The development of procedures for summoning and dispatching aid.
- o The development of an up-to-date comprehensive plan for prehospita1 emergency medical services.

2. Emergency Medical Services Systems Act of 1973

In 1973, Congress recognized that there were major deficiencies in the provision of health care that were beyond the reach of the prehospital systems supported under the Highway Safety Act. Many communities were unable to coordinate all of their medical resources into a system that could respond to medical emergencies and provide definitive care from the scene of an accident to the hospital intensive care unit. To encourage the development of such systems Congress enacted the Emergency Medical Services System Act (P.L. 93-154) on November 16, 1973, over a Presidential veto.

The act added to the Public Health Service Act a new Title XII for EMS sys terns and research grants. It also added to Title VII a new section 776 for EMS training grants.

The Emergency Medical Services Systems Amendments of 1976 (P.L. 94-573), enacted October 21, 1976, amended the 1973 authorities and extended the authorization of appropriations; added a new title 1221, authorizing a Burn Injury Program; and amended the authorities and extended the authorization of appropriations for the EMS training grants in a redesignated Section 789 (previously Section 776). Additional amendments (P.L. 96-142) were enacted on December 12, 1979. They extended the authorization of appropriations for three fiscal years, increased the authorization of the Burn Injury Program, and added poison and trauma injuries to the Burn Injury Program. Figure II-1 presents a summary of the EMS program objectives and of the changes made in 1976 and 1979.

The Emergency Medical Services Systems Act is presently made up of 13 sections, which are:

- 1201 -- Defines an Emergency Medical System as an arrangement of personnel, facilities, and equipment for the effective and coordinated delivery in an appropriate geographical region of health care services under emergency conditions.
- 1202 -- Authorizes grants and contracts to any eligible entity to conduct feasibility studies of, and/or plan for, the establishment of an EMS system in either the Basic Life Support, or Advanced Life Support mode.

OBJECTIVE	CHANGES 1976	CHANGES 1979
Section 1201 -- Defines the EMS System		
Section 1202 -- Describes grants/ contracts for feasibility studies and planning projects	1976 Amendments -- Feasibility and Planning for BLS/ALS in rural and to medically underserved areas	Priority given to eligible applicants only
Section 1203 -- Describes grants/ contracts for establishment and initial operation of EMS (BLS)	The term Basic Life Support established	
Section 1204 -- Describes grants/ contracts for expansion and improvement of the EMS (ALS)	The term Advanced Life Support established	Extended Financial assistance for exceptional need
Section 1205 -- Describes grants/ contracts for research of EMS techniques, devices and methods, particularly toward improvement of the delivery of EMS	Emphasizes research on rural improvement	
Section 1206 -- Defines eligibility for grants/contracts; EMS provisions of personnel, training, facilities, their adequacy and utilization; technical assistance	Provisions for auditory handicapped and for those of limited English speaking capability; utilization of highway safety program communications and equipment; EMS evaluation and review	
Section 1207 -- Lists authorizations for appropriations from 1974 to 1982		
Section 1208 -- Administration of grants/contracts	Provide technical assistance; special consideration for rural areas; periodic independent evaluations of program effectiveness; on-going study of all EMS Federal programs/ activities	
Section 1209 -- Description of the Interagency Committee on EMS and its responsibilities		
Section 776 -- Grants/Contracts with schools of medicine, nursing schools, and allied health professions, for EMS assistance and provisions, particularly those affording clinical experience. Establish special project grants	Re-designated as Section 789; hospitals having training programs which meet requirements and apply for grants	
Section 4 -- A study to determine legal barriers to effective delivery of medical care under emergency conditions		
	Part B -- Burn Injuries	Adds poison and trauma injuries activities
	Section 1221 -- Establishesgrants/ contracts for program activities relating to burns such as establishment, operation, improvement of activities, research	

FIGURE I I-l

- 1203 -- Authorizes a maximum of two awards to an eligible entity to implement and operate a Basic Life Support EMS System.

- 1204 -- Authorizes a maximum of two awards per eligible entity for the expansion and improvement of a Basic Life Support System to an Advanced Life Support EMS System.

- 1205 -- Authorizes grants and contracts for the support of research in emergency medical techniques, methods, devices, and service delivery.

- 1206 -- Establishes the general provisions and restrictions governing EMS grants and contracts.

- 1207 -- Authorization of appropriations through fiscal year 1982.

- 1208 -- Establishes administration of the EMS program with the Secretary of Health and Human Services, or his designee.

- 1209 -- Establishes an Interagency Committee on Emergency Medical Services to evaluate the adequacy and technical soundness of all Federal programs and activities related to EMS. The committee shall also act as a forum for the exchange of information and the maintenance of coordination among agencies involved in EMS.

- 1210 -- Requires an annual report to Congress on the activities and effectiveness of the EMS program.

- 1221 -- Authorizes Demonstration Projects in the areas of burns, poison, and trauma.

- 776/789 -- Authorizes grants and contracts for the funding of training programs for Emergency Medical personnel.

- 4 -- Provides for a study to evaluate legal barriers affecting delivery of medical care under emergency conditions.

3. Funding History

Funding for the DEMS grant program was first authorized and appropriated in Fiscal Year 1974. During its six-year history, the DEMS grant funds have averaged about $30 million annually,with a range of $17 million to $36 million.

Figure II-2presents a summary of grant awards made under the EMS Act Sections administered by DEMS. As the table shows, 534 awards for a total

EMERGENCY MEDICAL SERVICES

SUMMARY OF GRANT AWARDS -- FY 1974 - FY 1979

FISCAL YEAR	SECTION OF EMS ACT						TOTAL	
	1202		1203		1204			
	No. of Awards	Amount*	No. of Awards	Amount	No. of Awards	Amount	No. of Awards	Amount
1974	53	2.3	21	10.4	'11	4.4	85	17.1
1975	56	4.6	49	19.5	11	8.1	116	32.2
1976	0	0.0	41	21.8	11	7.3	52	29.1
1977	14	1.0	44	21.8	25	10.0	83	32.8
1978	11	0.9	53	23.6	29	11.5	93	36.0
1979	24	1.1	49	20.4	32	13.9	105	35.4
TOTAL	158	9.9	257	117.5	119	55.2	534	182.6

* Amount in millions of dollars.

SOURCE: Report of the Committee on Labor and Human Resources, United States Senate to Accompany S 497, April 30, 1979.

of $182.6 million have been made. Almost half of those were made under the 1203 section of the act. One can also see a shift in the number of awards. During the early years of the program there were more planning grants (1202) and first year operation (1203) grants, while during later years more awards are being made for second year operations (1203), and expansion and improvement grants (1204). This trend seems to verify the program logic of moving EMS systems through the funding cycle.

Figure II-3 presents the program status of the 304 EMS regions identified by DEMS. During the current Fiscal Year, 105 regions received some kind of DEMS funding. From FY 1974 through FY 1979, 292 regions received assistance under Title XII of the EMS Act. Twelve regions remain to be funded, and 29 regions have graduated from the DEMS program and are no longer eligible to receive Title XII assistance.

Figure II-4 summarizes the grant programs authorized by the EMS Act. Included in this chart are the funding levels for 1205 Research Grants administered by NCHSR and Manpower and Training Grants administered by the Bureau of Health Professions.

Appendix C traces the DEMS funding history for each of the 304 EMS regions. The table was constructed using program data at DEMS Headquarters. Regions are listed on the left by state and by region name or region location. Grant awards to each region are separated by section of the EMS Act and by the year of award.

Looking through the data presented in Appendix C a general picture of the program funding history begins to emerge. Almost every state has taken part in the grant program, though not all of their regions appear to have taken full advantage of the funding available. In general, the urbanized regions appear to have been more successful in moving through the grant program, though a number of rural regions have been equally as successful.

Many of the states have established agencies to coordinate EMS activities, particularly in the initial planning phase. Several of the smaller and less populated states have also established statewide EMS systems. This

EMERGENCY MEDICAL SERVICES

PROGRAM STATUS -- 1980

SECTION OF EMS ACT	CURRENT GRANT STATUS FY 1979	TOTAL GRANT STATUS FY 74 - FY 79
Never Funded	NA	12
1202 -- Planning Grants	23	86*
1203(1) -- Initial Operation (BLS)	21	42
1203(2) -- Initial Operation	28	76
1204(1) -- Expansion and Improvement	21	47
1204(2) -- Expansion and Improvement (ALS)	12	12
Graduated	NA	29
TOTAL	105	304

* Does not include 12 1202(b) grants awarded to regions that also received 1202(a) grants.

SOURCE: Fiscal 1979 Annual Report -- Emergency Medical Services Program.

FIGURE II-3

EMERGENCY MEDICAL SERVICES

GRANT PROGRAM -- FY 1974 - FY 1979

SECTION OF EMS ACT	FISCAL YEAR					
	1974	1975	1976	1977	1978	1979
1202 -- Planning Grants	2.3*	4.6	0.0	1.0	0.9	1.1
1203 -- Initial Operation Support	10.4	19.5	21.8	21.8	23.6	20.4
1204 -- Expansion and Improvement	4.4	8.1	7.3	10.0	11.5	13.9
1205 -- Research	3.3	4.4	4.0	3.9	3.0	3.0
776/789 -- Manpower and Training	6.7	0.0	0.0	3.0	6.0	3.0
TOTAL	27.1	36.6	33.1	39.7	45.0	41.4

* In millions of dollars

SOURCE: Unpublished Budget Data -- EMS Program.

FIGURE II-4

seems to indicate that there is strong support for EMS programs, and the likelihood of continuing eupport once a region has completea its eligibility.

One interesting aspect of the funding history is the unequal development of regions within a particular state. Often, one region will start the funding cycle several years before there is any activity in the other regions. This could be an indicator of a disparity in available medical resources as well as a reluctance to move in all the areas of a state at once.

One caveat should be kept in mind when using this table: it does not provide a complete funding history for each region. DEMS Headquarters has maintained summary budget information by state since, in most cases, states are the prime grantee. Though in many instances we have been able to piece together a funding history for the regions within a state, there remain many gaps and inconsistencies that should be reconciled before a definitive analysis can be undertaken.

B. PROGRAM ORGANIZATION AND OPERATIONS

The key organizational entities responsible for the administration of the national EMSS program are the Division of Emergency Medical Services (DEMS), Bureau of Medical Services, HSA, the Regional PHS Offices and the individual State lead agencies. The Bureau of Health Professions (BHP) and the National Center for Health Services Research (NCHSR) are also involved in the national EMSS program. An Interagency Committee on EMS (IACEMS) has been formed to coordinate the EMS activities of the variety of Federal agencies.

The primary activities and responsibilities of these organizational entities are reviewed below.

1. The Division of EMS (DEMS)

DEMS is staffed by nine full-time professionals and three support staff. Program administration necessitates a myriad of activities:

- o Development of program policy,
- o Development of program guidelines,
- o Grant cycle administration,
- o Financial management,
- o Provision of technical assistance,
- o Evaluation,
- o Information clearinghouse development and operation, and
- o Interagency Committee coordination.

DEMS is also responsible for the administration of all special initiative programs (burn, poison, spinal cord, trauma).

2. The PHS Regional Offices

The number of personnel assigned to the EMSS program vary in each of the PHS Regional Offices. Nationwide, 29 positions have been allocated to the EMSS program. On the average, each Regional Office has two to three full-time staff members working for the EMSS program. Within each office, a section for grants administration works with the EMSS personnel in reviewing and monitoring the grants in the region. The primary responsibility of the Regional Office is the coordination and administration of the grant process. (See Section C. for a discussion of the grant process.)

Each Regional Office is also responsible for provision of technical assistance to the grantees. This assistance focuses on the development of the grant application, financial management of the grant award, system planning, design and regulation. The Regional Offices work with the State lead agencies as well as with the individual grantees.

3. The State Lead Agencies

The State lead agencies have the primary responsibility for the coordination and administration of EMSS activities within the state. Since one of the key objectives of the national program is the regionalization of service delivery, the role of the State lead agency is important. Each of the EMS regions within the state must be developed in relation to the others; the State lead agency is responsible for assuring that this occurs as the systems evolve.

In many instances, the State lead agency is the grantee for all of the EMSS regions established within the state. Individual regions may be the grantees in other instances in which case, the State lead agency has the responsibility for reviewing and commenting on the grant applications. Both funding approaches are evidenced in the EMSS program. The State as the grantee or regional program grantees are common funding arrangements. In exceptional instances, such as in California where no State lead agency is staffed, thereview and comment function resides with the Regional Office.

4. The Interagency Committee on EMS (IACEMS)

The IACEMS is made up of representatives of those Federal agencies with an EMS component. These include: the Health Services Administration; the Bureau of Health Professions, HRA; Department of Medicine and Surgery, the Veterans Administration; Department of the Interior; National Science Foundation; the National Center for Health Services Research; EMS Branch, National Highway Traffic Safety Administration, the Department of Transportation; the Departmentof Commerce; Federal Communications Commission; the Department of Labor; Office of the Surgeon General, Army; the National Institute of Mental Health; Alcohol, Drug Abuse, Mental Health Administration; National Heart, Lung, Blood Institute, National Institute of Health; Federal Emergency Management Agency; the Department of Justice; the Food and Drug Administration; the Farmers Home Administration.

Providers of care and consumers also have membership on IACEMS. The IACEMS has as its mandate the evaluation of the adequacy and technica?

soundness of all Federal programs and activities related to EMS. In addition, the Committee is to serve as a forum for communication between Federal programs and to make recommendations to the HHS Secretary about the current and future programs in EMS. The IACEMS has no role in the grant cycle process.

5. The National Center for Health Services Research

Section 1205 of the EMSS Act makes available funds for grants and contracts for research. The National Center for Health Services Research is responsible for reviewing and funding grants and contracts for the support of research in emergency medical techniques, methods, devices and delivery. Monitoring of research effort and subsequent publication and dissemination of the research results are the responsibility of NCHSR. (Section E, Review and Evaluation, provides additional discussion of NCHSR activities.)

6. The Bureau of Health Professions (BHP)

As indicated, Section 789 makes available funds for grants and contracts to train emergency medical services personnel. Such personnel include: Emergency Medical Technicians -- Ambulance (EMT-A); Emergency Medical Technician -- Paramedic (EMT-P); Emergency Nurses; and, Emergency Physicians. At least 30 percent of the funds appropriated for any fiscal year must be used to train physicians in emergency medicine. Entities eligible for grant funds include: schools of medicine, osteopathy and nursing; allied health professions training centers; hospitals with training programs; and public or non-profit private organizations which have the provision of educational programs as one of its major functions and which itself delivers emergency medical services (or has a written agreement with an organization which delivers these services and agrees to provide the setting for the clinical experience required for the proposed training).

The Bureau of Health Professions is responsible for: informing eligible entities of the availability of funds; providing grant application packages; grant review, award and monitoring. The grant review process is centralized

and involves: an objective staff review which organizes and summarizes information on each grant application; a peer review, done by a group of physicians, nurses and others involved in EMS training, which results in grant applications being scored and ranked; and final review by a National Advisory Council on Health Professions Training.

C. THE GRANT PROCESS

EMSS Act funds are awarded on as annual basis to eligible entities. (Eligible entities include: States; units of local or general government; free-standing non-government EMS councils; non-profit corporations.) Grant funds are made available for initial planning and start-up activities (1202), the development of Basic Life Support Systems (BLS) (1203), and for the development of Advanced Life Support Systems (ALS) (1204).

The funding cycle for developing EMS systems has been designed to provide five years of financial support to developing systems. Each year, a new grant application must be submitted to obtain funds. In the planning stage, the grantee is given one year to progress to a point at which a BLS can be introduced. The 1203 systems can then be funded for two years. It is necessary to progress to an ALS system if another two years EMS funds are to be awarded. (The specific requirements for 1202, 1203, and 1204 grantees are discussed in greater detail in Chapter III, Program Objectives.)

Some systems will be funded for five years consecutively, having demonstrated satisfactory progress in developing a comprehensive EMS system. Not all systems, though, are necessarily funded in this sequence. Systems drop out of the funding cycle for a variety of reasons; communities may feel that a BLS system is all that the region needs or can support. Unsatisfactory performance may result in a region's not receiving additional funding; these regions either drop out entirely or reapply at a later date.

The Regional Office may allow a system to extend the use of one year's grant funds if it is felt that more time at a particular stage is needed. For

example, a system in the second year of its 1203 funding may elect not to apply for a 1204 grant. If the Regional Office approves, the remaining 1203 funds can be used to sustain the system for another year. The type of extension is granted for a variety of reasons. Systems are not always able to progress at the rate necessary to qualify for the next stage in the funding cycle; if an extension of time is allowed, these systems can often accomplish the required activities albeit at a slower rate.

Figure II-1 shows the activities and approximate dates of the annual grant review and award process. This schedule is similar for all regional offices nationally and the activities are common to all offices as well. Based upon the Regional Office recommendations, grant awards are usually made in June of each year.

1. Regional Office Grant Application Review

The Regional Office EMS Staff evaluate the grant applications to check for eligibility; clearances and assurances; overall compliance with the Federal program guidelines; financial and administrative soundness. Certain aspects of the evaluation are carried out by the technical and physician consultants for the PHS region. The communications and critical care plans are usually reviewed by the consultant advisors due to the need fqr specialized expertise not normally available in-house in the PHS Regional Offices.

2. National Office Grant Application Review

All grant applications are forwarded to DEMS for review and evaluation. DEMS staff also receive the recommendations from the Regional Office. DEMS has a review and comment responsibility for the 1202 and 1203 grant applications. For the 1204 grant applications, DEMS has the authority to disapprove the application even if the award has been recommended by the Regional Office.

3. Program Performance Monitoring

The performance and progress of the individual EMS regions is monitored by the State Lead Agencies, the PHS Regional Offices and DEMS.

REGIONAL OFFICE EMS GRANT REVIEW PROCESS

	Action/Activity	Deadline Date (Approximate)
1.	Advise States of Critical Dates	January 3
2.	Conduct Regional Technical Assistance Grantsmanship Conference	January 3
3.	Receipt of Grant Application-(Regional PHS Office, A-95 Clearinghouse(s) Health System Agencies (HSA's)).	March 1
4.	Distribution of Applications to Reviewers	March 3-7
5.	In-house PHS Program/Technical Committee Review (EMS Staff, Office of Grants Management; Consultants)	March-April 12
6.	Official Regional Office Program/Technical Committee (EMS Staff, OGM, Consultants, Applicants)	April 21-25
7.	EMS Program/Technical Committee Reviews Write-ups and Recommendations (EMS Staff)	April 28-May 9
8.	A-95 Clearinghouse(s) and Health System Agency(s) Comments to the Regional PHS/EMS Office	May 1
9.	Regional Office Objective Committee Review	May 12
10.	RO Objective Review Committee Write-up Regional Health Administrators Recommendations	May 12-30
11.	Joint Regional Office/Central Office Review	1st week of June
12.	EMS Program Staff Develops/Submits Summary of Action to Office of Grants Management	June 9-13
13.	Advice of Allowance Issued to the RO by the CO	June 13
14.	RO issues Grant Awards	June 30

FIGURE 1.1-1

a. State Lead Agency Monitoring Functions

The reporting responsibilities of individual EMS regions are developed by the State lead agencies. In most instances, each region is required to submit quarterly reports. These reports contain a narrative description of the progress accomplished, problems or obstacles to progress and a financial summary of the dollar expenditures and obligations. The information contained in this report is compared to the implementation workplan developed and submitted by the EMS regions' in their grant applications. These reporting requirements are the only formal obligation of the EMS regions to the State lead agencies.

A tremendous amount of information on program performance and progress is obtained on an informal basis. State lead agency staff attempt to site visit each of the EMS regions every two to three months to evaluate the status, progress or problems which exist.

b. The PHS Regional Office

The quarterly reports which are used by the State lead agencies are also used by the PHS Regional Offices to monitor the activities of the individual EMS regions. Progress is measured against the implementation workplan which is kept by the PHS Regional Offices as well as by the State lead agencies.

The PHS Regional Offices sustain informal communications with the EMS regions and the State lead agencies and garner timely information in this way.

C. DEMS

The only formal reporting requirements for the EMS regions to DEMS which currently exist are the annual evaluation abstracts and the quarterly reports. The evaluation abstracts represent the final report due annually from each of the EMS regions. This report is forwarded to both the State lead agency and the PHS Regional Office. However, its use has been intended primarily for the national office.

The evaluation abstracts are to contain information on the progress and performance of the EMS region in the 15 component and 7 critical care areas. Specific guidelines for the content of this report are provided in the EMSS Act Program Guidelines. The EMS regions are asked to qualitatively and quantitatively evaluate the degree to which they have achieved objectives.

D. PROGRAM GUIDELINES AND TECHNICAL ASSISTANCE WORKSHOPS

Guidance is provided to grantees by an extensive set of program guidelines. First developed in 1976, revised in 1977 and substantially expanded in 1979, the program guidelines document outlines in detail the information and activities required of all grantees. The components of the EMS system which need to be developed are described, as are the clinical areas which must receive attention in all phases of system development. (See Chapter III, Program Objectives, for a discussion of information in the program guidelines.)

A second source of guidance are the technical assistance workshops and conferences. Four regional conferences and one national conference are co-sponsored by the national office usually in conjunction with one of the EMS programs. Many smaller workshops and seminars are held throughout the country by the regional EMS programs; often these address a specific component (communications) or clinical (trauma) area. Figure II-Z on the following page provides a listing of the conferences and workshops held in 1979 and those to be held in 1980. The agenda of the most recent national conference is given in Figure II-3.

Faculty at the national and regional conferences are drawn from the national office staff, academic institutions, the EMS programs and outside consultants.

NATIONAL AND REGIONAL CONFERENCES ON EMSS

1980

Jan. 30 - Feb. 1	National Symposium "Issues Impacting EMS Systems"	Baltimore, MD
Aug. 12-13	Special Technical Assistance for EMS Planners	Rockville, MD
Oct. 8-9	Technical Assistance - Evaluation	Rockville, MD
Oct. 27-30	Regional Conferences	Newport, RI
Nov. 13-15	Regional Conferences	Hilton Head, SC
Nov. 17-20	Regional Conferences	Oklahoma City, OK
Dec. 1-4	Regional Conferences	Phoenix, AZ

1979

Feb. 20-23	National Symposium "Progress, Perspectives and Prospectives on EMS in the USA"	Washington, DC
Jul. 24-26	National Symposium "Medical Accountability, Legislation and Funding -- EMSS"	Anahiem, CA
Oct. 16-19	Regional Conferences	Portland, ME
Nov. 13-16	Regional Conferences	Denver, CO
Dec. 10-12	Regional Conferences	New Orleans, LA

FIGURE II-2

THE AGENDA OF THE NATIONAL EMSS CONFERENCE

Baltimore, Maryland

January 30, 1930 -- February 1, 1980

	Wednesday January 30, 1980	Thursday January 31, 1981	Friday February 1, 1980
8:30 - 10:00	General Session	General Session	General Session
10:15 - 12:oo	WORKSHOPS New DHEW/EMS Legislation Reimbursement for Ambulances EMS as a Third Service Disaster Planning Pending FY80 Sect. 1221 Poison Funds	WORKSHOPS Funding Sources Pending FY80 Sect. 1221 Trauma Funds Human Organ Donor Program Public Education - CPR	General Session
1:oo - 3:oo	WORKSHOPS Specialty Center Designation Process Role of the State Lead Agency Federal/State EMS Guidelines Categorization Standards State Statutes vs. EMS Regulation	WORKSHOPS Communications Guidelines Training Evaluation By States Medical Control/Accountability EMS Councils	

FIGURE II-3

III, PROGRAM OBJECTIVES

The objective of the national EMS program is to reduce morbidity and mortality and to improve patient care through development of wall-to-wall "systems" of regional emergency medical service delivery. The EMSS Act funds are to be used as "seed" monies in the development of multigovernmental, multicommunity comprehensive EMS systems. Involved communities are expected to provide matching funds and assurances of continued support.

The regional EMS programs are to be developed through the integration and coordination of the EMS resources in the area. Each region is required to form a regional advisory council made up of providers and consumers. Additionally, a State lead agency must be designated to assume responsibility for the coordination and management of a State EMS plan. This activity requires the management of the grants, inter-region and inter-state coordination, state system design and operation.

Designated EMS regions number 304 and in many cases are congruent with the areas served by the Health Systems Agencies (HSA's) designated by the National Health Planning and Resources Development Act of 1974 (P.L. 93-641). Varying types of system configuration are allowed for and encouraged by the EMSS legislation; however, each system must devote attention to 15 components and 7 critical areas. The 15 components are:

- o Manpower,
- o Training,
- o Communications,
- o Transport,
- o Facilities,
- o Transfer agreements,
- o Mutual aid,
- o Public information and education,
- 0 Critical care plans,

- o Evaluation,
- o Disaster plans,
- o Public safety agencies,
- 0 Access to care,
- o Coordinated patient recordkeeping, and
- 0 Consumer participation.

The seven critical care areas are:

- o Trauma
- o Burn
- o Spinal Cord
- o Acute Cardiac
- o Neonate
- 0 Poisoning
- o Behavioral

A. PROGRAM COMPONENTS

The content and scope of each component include the following.

1. Manpower/Training

Sufficient numbers of appropriate personnel (first responders, dispatchers EMT-A, EMT-I, EMT-P, RN-Emergency Department, RN-Critical Care Units, MICU Coordinators, MD's-Emergency, Specialty, Consultant, EMS Project Directors, Coordinators, Consultants) to provide 24-hour, 7-day EMS coverage. Provision for training and continuing education.

2. Communications

Development of a communications system that addresses access,dispatch and medical control.

a. Access

Access to provide the public with efficient interface with the EMS system should be 911 or an alternative single access number. Provision should also be made for access by those with an auditory handicap and by the non-English speaking population of the region.

b. Dispatch

Dispatch should be central dispatch or centally coordinated dispatch which effectively coordinates EMS with other public services.

c. Medical Control

Medical control is to be provided by equipment which allows for communication between field personnel and hospitals for diagnosis, treatment and triage. In a BLS system, a minimum of duplex communication must be implemented; in ALS, duplex communication with advanced biomedical telemetry is required.

3. Transportation

An adequate number of ground, air and water vehicles to meet the needs of the BLS and/or ALS system; vehicle location should permit for 95 percent of all calls, a maximum of a 30-minute response time in rural areas. All vehicles should meet national standards for design, performance and basic equipment. In BLS systems, radio communication and at least two EMT-A's on each ambulance should be evident. In ALS systems, at least two EMT's trained beyond the EMT-A level (EMT-Intermediate, EMT-Paramedic) and advanced communications (duplex, telemetry capability) should be provided.

4. Facilities

An adequate number of designated emergency medical service facilities, collectively capable of providing services on a continuous basis. Nonduplicative service should be provided by facilities which have been categorized

horizontally (American Medical Association (AMA) criteria) and vertically (criteria of American College of Surgeons (ACS); American Burn Association (ABA); American Heart Association (AHA); American College of Pediatrics (ACP); American Psychiatric Association (APA); and, the American Association of Poison Control Centers (AAPCC)). Such categorization shall provide for at least one Category II hospital providing 24-hour physician coverage for the region. In addition, regional plans should be developed for inter-hospital relationships (critical care capabilities, transfer and resource sharing).

5. Critical Care Units

Provision of access to specialized critical care units to include trauma, burn, spinal cord, acute cardiac, poisoning, neonate and behavioral emergency service. Triage, and transfer protocols and mutual aid agreements should be created to guide the utilization of these facilities.

6. Review and Evaluation

Periodic, comprehensive and independent reviews and evaluation of the scope and quality of the emergency medical care services provided by the EMS system. Such evaluations and reviews are to contain a narrative description of the characteristics (geographical area, population, resources, organizational design of the EMS system) and the activities (components implemented, degree of use) of the EMS system. Compliance studies which test the number of patients going to the appropriate designated center, studies on death, disability and patient outcome (treatment effects, therapy alternatives) are also required of the EMS programs.

7. Public Information and Education

Development of programs to increase the awareness of the public about the EMS system, how to access the system, and appropriate use of the EMS system.

8. Patient Transfer

Provision for transfer of patients to facilities which offer comprehensive and appropriate follow-up care and/or rehabilitation.

9. Mutual Aid

Eastablishment of arrangements with other EMS systems for access to emergency medical care on a reciprocal basis. These agreements are to serve in those instances when access to such care would be more appropriate and effective in terms of time, distance and service availability.

10. Public Safety Agencies

Provision for the participation and effective utilization of the personnel, facilities and resources of existing public safety agencies (police, fire, park service, MAST units, life guards, coast guard). Effective utilization will necessitate integration of public safety agencies' activities into the standard EMS plan and the disaster plan.

11. Access to Care

Assurance of access to appropriate emergency medical care without inquiry as to ability to pay. Assurance of such access must be made by providers of all aspects of care within the EMS system.

12. Disaster Planning

A plan developed to assure provision of emergency medical services in the event of natural disasters or national emergencies. Testing of the plan is required through the use of mock disaster drills.

13. Coordinated Patient Recordkeeping

Development of a patient recordkeeping system to cover the treatment of the patient from entry until discharge from the EMS system (pre-hospital,

hospital, critical care and follow-up care facilities). Minimum data points should include: patient identification information (consistency between dispatch, ambulance, emergency department and critical care unit records); patient access information; timing of ambulance services; patient condition; patient diagnostic/treatment services; patient disposition; patient condition.

14. Consumer Participation

Assurance that consumers with no professional training or experience participate in the policy decisions concerning the development of the EMS system.

The seven clinical areas which are to be addressed by any developing EMS system include: trauma; cardiac; spinal cord; burn; neonate; poison; and behavioral emergencies. Integration of the 15 components in both BLS and ALS systems should provide for patient identification, transport to the appropriate specialty centers and all aspects of pre-hospital and hospital treatment, for each of these patient categories.

B. BASIC LIFE SUPPORT/ADVANCED LIFE SUPPORT

The EMS legislation mandates the development of regional systems from the planning stage (Section 1202 - one year of funding) through Basic Life Support (BLS) (Section 1203 - two years funding) and Advanced Life Support (ALS) (Section 1204 - two years funding). These levels of development represent increasing system sophistication. Both the BLS and ALS systems continue the management and coordination of the 15 components and 7 critical care areas.

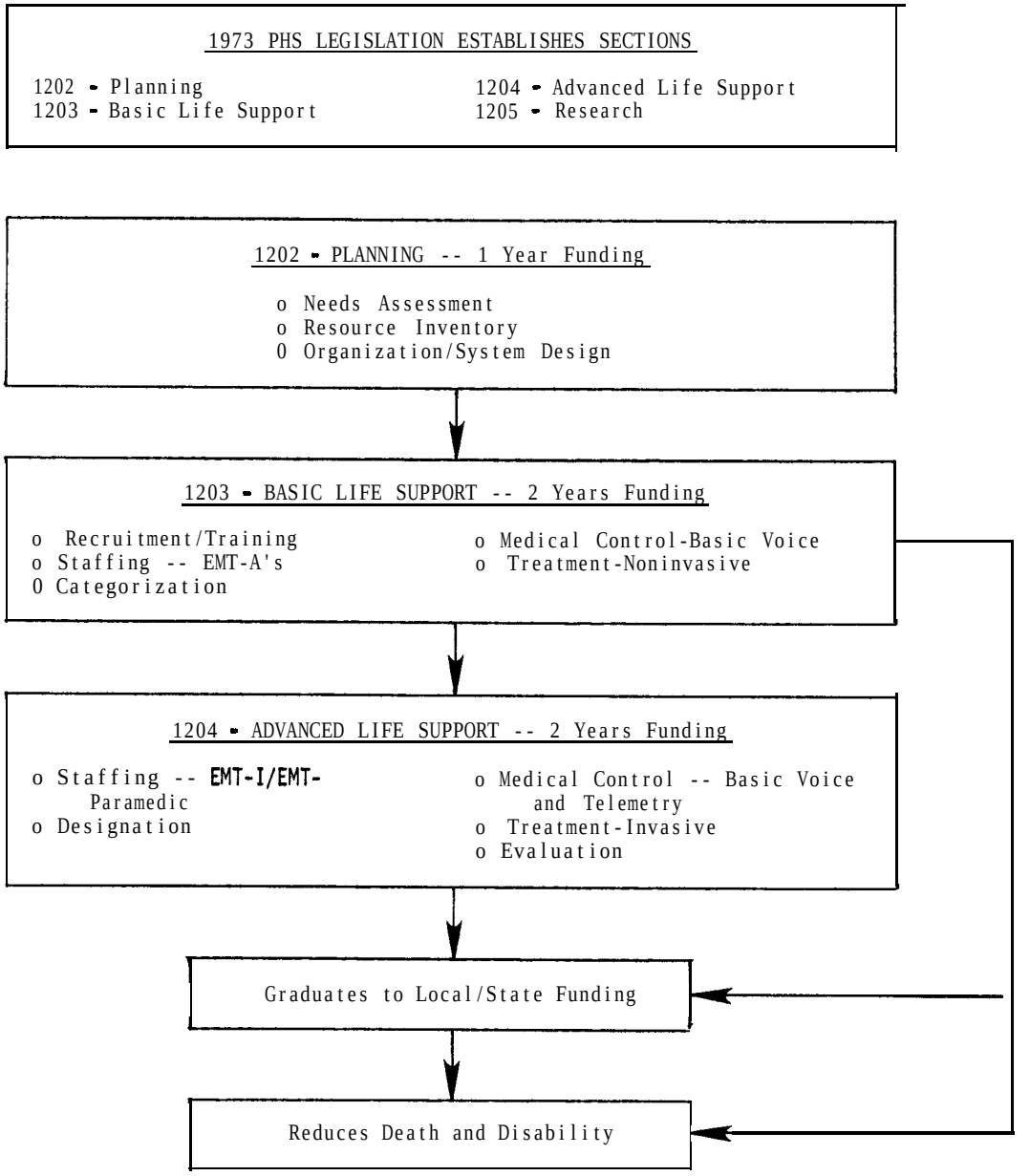
BLS systems require the placement and use of ambulances and equipment which meet national (General Services Administration) specifications. These vehicles are to be staffed by at least two EMT-A's. The EMT-A's are allowed to provide patient stabilization (airway clearance., hemorrhage control, initial wound care and

fracture stabilization). Treatment by EMT-A's is non-invasive. Communications in a BLS system must provide for single access, central or centrally coordinated dispatch and for medical control.

ALS systems are the logical progression of the BLS system. Vehicles must be staffed by EMT-Paramedics in an ALS system; paramedics can provide additional care in the field. Patient resuscitation can be done by paramedics using specific invasive measures. These invasive measures include: endotracheal or esophogastric intubation, intravenous therapy, and specific cardiac dysrhythmia detection and control with drugs and electrocountershock. Such intervention can only be done while the paramedic is under the direct medical control of a physician. Communications must be sophisticated enough to allow for direct voice contact and advanced biomedical telemetry between field personnel, resource and receiving hospitals. An additional requirement of the ALS system is the categorization and designation of facilities within the area. Transport, triage, treatment and transfer protocols must be standardized and implemented.

Figure III-1 on the following page provides the logic model of the EMSS legislation. Figure III-Z provides the implementation model of the EMS program.

EMS BUDGET AND LEGISLATIVE LOGIC MODEL



EMS PROGRAM COMPONENTS

Manpower
Training
Communications
Transportation
Facilities (categorization)
Critical Care Units (capacity)
Public Safety Agencies
Consumer Participation
Access
Patient Transfer
Recordkeeping
Consumer Information
Independent Evaluation
Disaster Linkage
Mutual Aid Agreements

EMS Program Critical Care Areas

Trauma
Burn
Spinal Cord
Neonate
Acute Cardiac
Poisoning
Behavioral

FIGURE III-1

EMS SYSTEM

IMPLEMENTATION MODEL

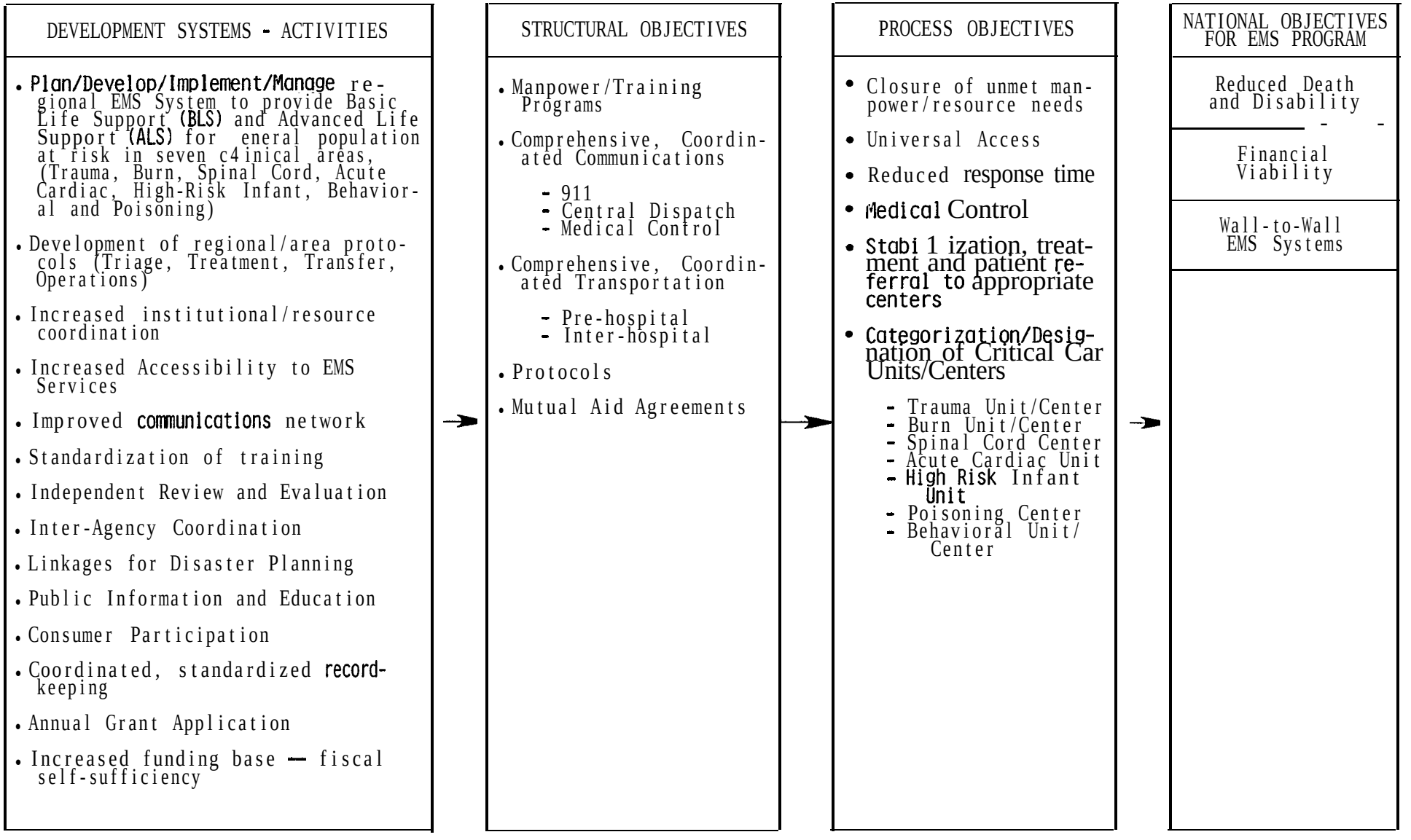


FIGURE III-Z

C. RESEARCH AND EVALUATION

1. Historical Overview -- Evaluation and EMS

a. DEMS

From the beginning of the program, the DEMS strategy has been to build evaluation into each of the individual systems. Evaluation is one of the required 15 components and the direction provided by the National Office has been substantial. Through the Program Guidelines, which contain explicit instructions for each component and critical care area, and through workshops and conferences, DEMS has provided guidance to the programs on evaluation. In addition, DEMS has collaborated with OPEL and contracted with outside consultants in efforts to provide further assistance to the programs, and to check the reliability of the information being provided.

It appears that many of the systems have been more highly concerned with program development andresource building than with evaluation, particularly during initial phases of funding. Programs attempted to meet the data requirements of the grant application and abstracts, but were not always able to submit complete or accurate information. The data that began to emerge in the early years of EMS were often descriptive in nature, focused on resource documentation, or evaluation of only one component. Often, the data were not comparable from system to system.

An overall program evaluation by HHS has not yet been initiated. The earliest priorities of the National Program were to get the systems in place and to regionalize emergency medical care. Other contraints, such as a small central office staff and questions on the reliability and completeness of the reported data, have made such evaluation difficult. In 1979 DEMS hired the first professional with primary responsibility for program analysis.

DEMS has been cognizant of the problems facing the evaluation issue and has begun promulgating plans for a new evaluation strategy

that would include patient outcome and program impact studies in addition to descriptive narratives and structural analyses. There is an increased pressure from the field for measurement of the reduction of morbidity and mortality not only to determine the effectiveness of EMS intervention strategies but also to justify the program itself.

b. Additional Reports

Agencies outside DEMS, though not directly involved in research and evaluation, have reported on the need for effectiveness studies and, indeed, have impacted on the EMS program as a whole. The National Academy of Sciences, National Research Council has a long-standing interest in the DEMS Program. Their landmark report, "Accidental Death and Disability: The Neglected Disease of Modern Society," stimulated public awareness for EMS in 1966. Six years later, NAS called for a coordinated national effort in EMS in "Roles and Resources of Federal Agencies in Support of Comprehensive Emergency Medical Systems." The latest NAS report, published in 1978, reviewed the status of EMS at that time. "Emergency Medical Services at Midpassage" noted that performance of EMS systems was often measured in terms of compliance with standards and recommended that research and evaluation be redirected toward effectiveness studies.

A 1976 GAO Report recommended improved evaluation guidelines for EMS systems and noted the problems that faced the programs including access to data and costs of evaluation. The report also noted that in order to measure EMS system effective on patient care, the scope of evaluation must extend beyond ambulance and emergency room records.

c. OPEL Studies

The primary focus of the Office of Planning, Evaluation and Legislation has been directed toward funding studies which examine, define and recommend strategies for dealing with the issues and problems that face EMS systems. Some of these key studies are highlighted in the following sections and are listed in Figure III-10.

OFFICE OF PLANNING, EVALUATION AND LEGISLATION
STUDIES IN EMERGENCY MEDICAL SERVICES

CONTRACTOR	TITLE	NUMBER
Transaction Systems, Inc.	Evaluation of Emergency Medical Services Systems Impact	HSA 105-74-g
Transaction Systems, Inc.	Assessment of Emergency Medical Systems Adequacy	HSA 105-74-g
Transaction Systems, Inc.	Legal Barriers Study	HSA 105-74-g
Macro Systems (Primary The Orkand Corporation)	Development of a Minimum Data Set for Emergency Medical Services Patient Record Keeping	HSA 105-74-6
Arthur Young & Company	Evaluation Workbook for EMS	HSA 240-75-0066
Arthur Young & Company	Handbook for Patient Record Keeping -- Systems for Emergency Medical Services-- List of Minimum Data	HSA 240-75-0066 (Task 2)
Arthur Young & Company	Reliability of Accuracy, Completeness, and Comparability of the Emergency Medical Service Systems Data Needed to Meet Reporting Requirements of Public Laws 93-154 and 94-573	HSA-240-78-0041

FIGURE III-10

Two of the early efforts sponsored by OPEL were designed to examine possible Federal and legal interventions that would assist EMS programs. The first, Assessment of Emergency Medical Services Systems Adequacy (1974) examined the current status of EMS and made recommendations for improved effectiveness of Federal intervention. One recommendation was the implementation of an information system to be coordinated between the states and the National Office. The second, Evaluation of Legal Barriers to EMS Implementation (1974), examined restrictive licensing and the presence or absence of laws that impeded EMS systems progress. The lack of emphasis on comprehensive evaluation and planning was noted in this study as well.

Throughout the existence of EMS, OPEL/HSA has encouraged data collection efforts and has funded various contracts designed to provide guidance to individual EMS systems. The Development of a Minimum Data Set for Emergency Medical Services (1974) involved the analysis of 60 EMS forms and the subsequent preparation of a list of data elements. The Handbook for Patient Recordkeeping -- Systems for Emergency Medical Services -- List of Minimum Data (1976) defined the data that was needed and described the various uses. It was made clear that the data to be collected would be too basic for use by systems managers for planning, monitoring or evaluation purposes.

The Evaluation Workbook for Emergency Medical Services (1975) was to assist the grantees with the reporting requirements. The report stated that the purpose was not to provide a means to measure EMS system impact, but to provide a framework for evaluation and to assist grantees. Program narratives, component status, resource inventory, and process, compliance and outcome measureswere discussed and explained.

In 1978, OPEL/HSA funded a study on the Reliability, Accuracy, Completeness and Comparability of the Emergency Medical Systems Data Needed to Meet Reporting Requirements of Public Laws 93-154 and 94-573. The study examined the 1978 abstracts required by DEMS for the 15 components

and 7 critical areas. More than 30 sets of abstracts were reviewed and three conclusions were drawn regarding the conditions for data collection:

- Statistics describing the incidence or prevalence of certain illnesses or injuries can be reliably collected and reported in compliance with the general patient population data requirements,
- EMS grantees reliably report data which result from their own in-house system development activities,
- Data reported is likely to be reliable when it is collected from a source which generates data closely aligned with the data required for DEMS reporting.

The study reported that non-reliable data results from several variables, including access problems, secondary sources used, various interpretations of the data requirements resulting in non-standard data being reported, and a lack of a planned and organized approach to data collection. Recommendations of the Final Report (Draft) included:

- The provision of technical assistance and feedback to the grantees for an evaluation strategy,
- Clear guidance definition of data requirements, i.e., a standardized national data base and program descriptive data,
- Input from individual sites on a data collection approach.

Three additional studies have been sponsored by OPEL/HSA, one of which is ongoing. The Evaluation of Emergency Medical Services Systems Impact was an early study (1974) designed to examine the effectiveness of EMS in reducing mortality through identification and review of existing data sources including published literature. The conclusions state that:

- Mortality has been reduced in the critical areas of trauma, cardiac and neonates by some systems;

- o Morbidity has been reduced for spinal and burn patients of some systems; and
- o Both mortality and morbidity have been reduced for poison by at least one system.

At that time, the investigations were not able to confirm the existence of regional EMS systems for drug, alcohol or psychiatric emergency treatment.

The Financial Self Sufficiency (1977) study has recently been completed, and though the sample of programs included (six graduate programs and nine current programs) is small, implications may be drawn and applied by other programs. The study focused on those strategies and organizational, managerial and financial factors that seem to be influencing the achievement of self sufficiency. Also examined were expenditures on the 15 components.* Strategies for achieving and monitoring self sufficiency and a critique and analysis of four major components of a funding plan are provided in the Final Report.

The EMS Amendments of 1976 mandated a National Burn Injury Program which would describe the status of burn care in the United States and collect data with which to evaluate the effectiveness of burn care delivery. In 1977, HSA initiated the Burn Patient Impact Study and Burn Demonstration Projects in coordination with HCFA, NCHSR, NCHS, the National Institute of General Medical Sciences, the National Fire Prevention and Control Administration and the Consumer Product Safety Commission. Participating sites have an estimated population of 28 million, and include New England (six states), the Fingerlakes and Central Region of New York, Virginia, Alabama (excluding Mobile), North Texas and San Diego and Imperial Counties. Burn data is being collected from emergency departments, outpatient departments, hospitals (those with specialized burn treatment facilities and those without) and the mor-

* The author's of the study note that the financial cross site analysis lacks precision due different accounting procedures and information based on expenditures at some sites and budgets at others.

gue. The demonstrations projects are examining the treatment of burns and the improvement of burn care. The Impact Study will examine the incidence of burn injury, costs of burn treatment, and the social economic and psychological implications of burn care delivery to the patient.

d. NCHSR

The National Center for Health Services Research (NCHSR) develops and has the administrative responsibility for the EMS research program as mandated under Section 1205 of the EMSS Act of 1973. The congressional intent was to promulgate research that would identify and help resolve problems and issues surrounding EMS programs. The research program at NCHSR has been more focused on the design and testing of performance measures, but it has been recognized that many systems have achieved developmental growth and are now capable of engaging more directly in research. NCHSR also supports research under Section 305 of the Public Health Service Act which addresses health services research in emergency medical services settings.

In addition to the research itself, NCHSR is responsible for disseminating information regarding any of the studies. NCHSR has sponsored a number of EMS Workshops aimed at presenting and encouraging EMS research, and periodically publishes abstracts and articles on current studies.

The research funded by grants from NCHSR covers a variety of areas involved with EMS. Severity indexes are being developed and tested to enable researchers to categorize/classify/compare patients with the same type of injury. Burn and trauma registries are being designed; compliance data is being collected. Patient tracking is occurring beyond the hospital emergency room to discharge, or admission or transfer to another facility. In some instances, patients are being followed at 6- or 12-month intervals after discharge. Clinical algorithms to assess training and performance of EMS personnel are being examined.

Specific research that has been of particular interest to this evaluability assessment include studies on the effect of particular components or critical care areas. Bergner in Seattle has had interesting results with several studies. In one, he has shown a reduction in the death rate of cardiac victims when:

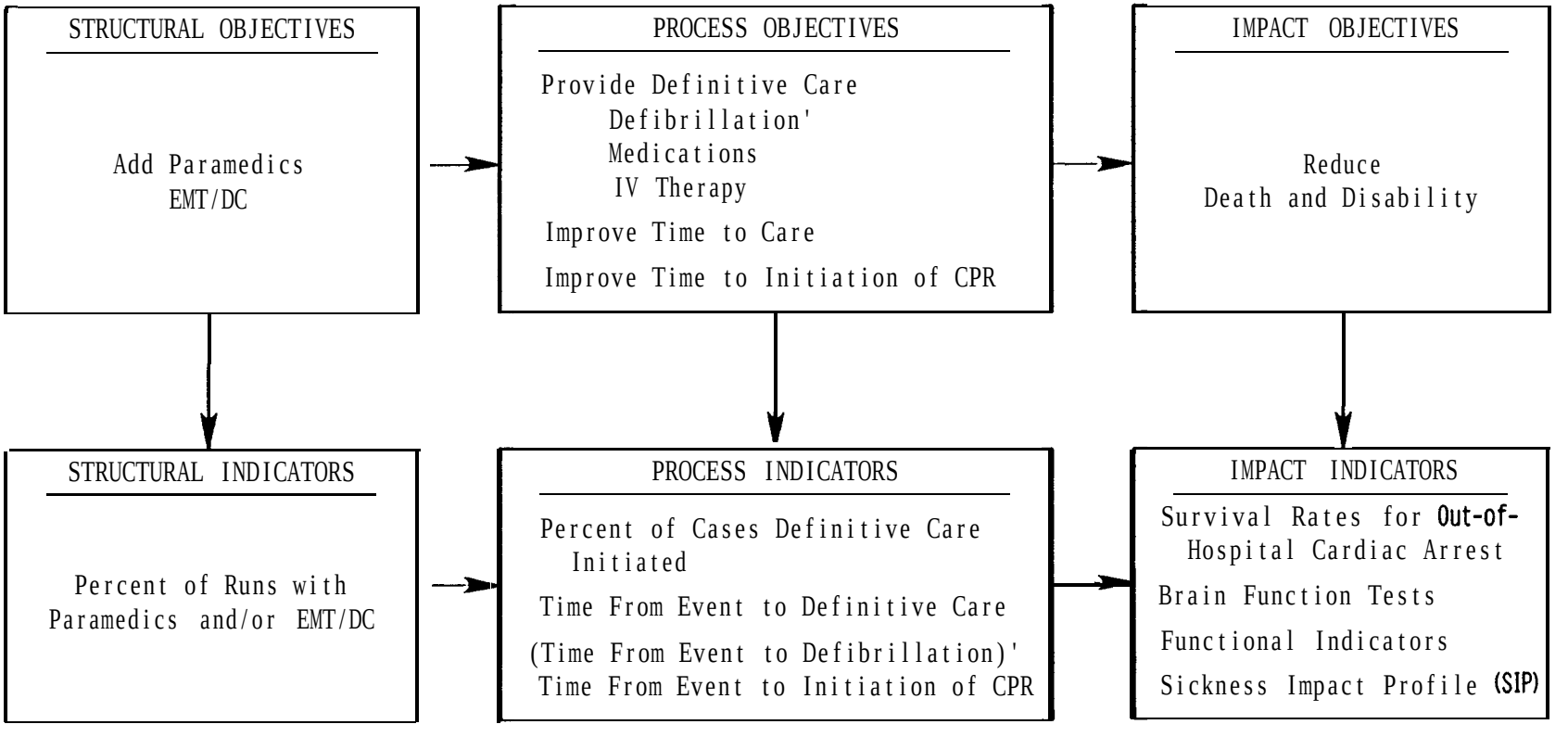
- o Paramedics are deployed,
- o Cardiopulmonary resuscitation is initiated within four minutes of symptom onset and defibrillation is initiated within eight minutes.

Bergner has shown that this sophisticated paramedic program designed forurbanareas can be successfully implemented in a suburban area. As a possible substitute for this expensive program, Bergner has had excellent results in another study which examines the training and equipping EMT's with defibrillators. Preliminary results indicate that survival rates of cardiac arrest victims treated by EMT's who are defibrillation-certified rival the rates of cardiac arrest victims treated by paramedics. These two studies form the basis of the model displayed in Figure III-11. The resources, i.e., paramedics and/or EMT/DC's, are shown under structural objectives. Utilization of the resources is shown as project objectives, i.e., time to care, etc. The desired result of the utilization of resources, reduced death and disability is the impact objective. The indicators are displayed under their respective objectives.

In another project, Cobb has shown that a cardiac arrest victim's chances of survival are improved when CPR is initiated quickly by a bystander. In 109 cases, patients received CPR from a bystander, 43 percent survived and were discharged. In 207 instances where the victim waited for the fire department, only 21 percent survived. An impact model of this study is shown in Figure III-12. In this instance, then, it has been shown that a reduction in death and disability (impact) occurs when the public (resource, structure) is trained in CPR and responds (process) to cardiac arrest.

MANPOWER AND TRAINING

IMPACT MODEL



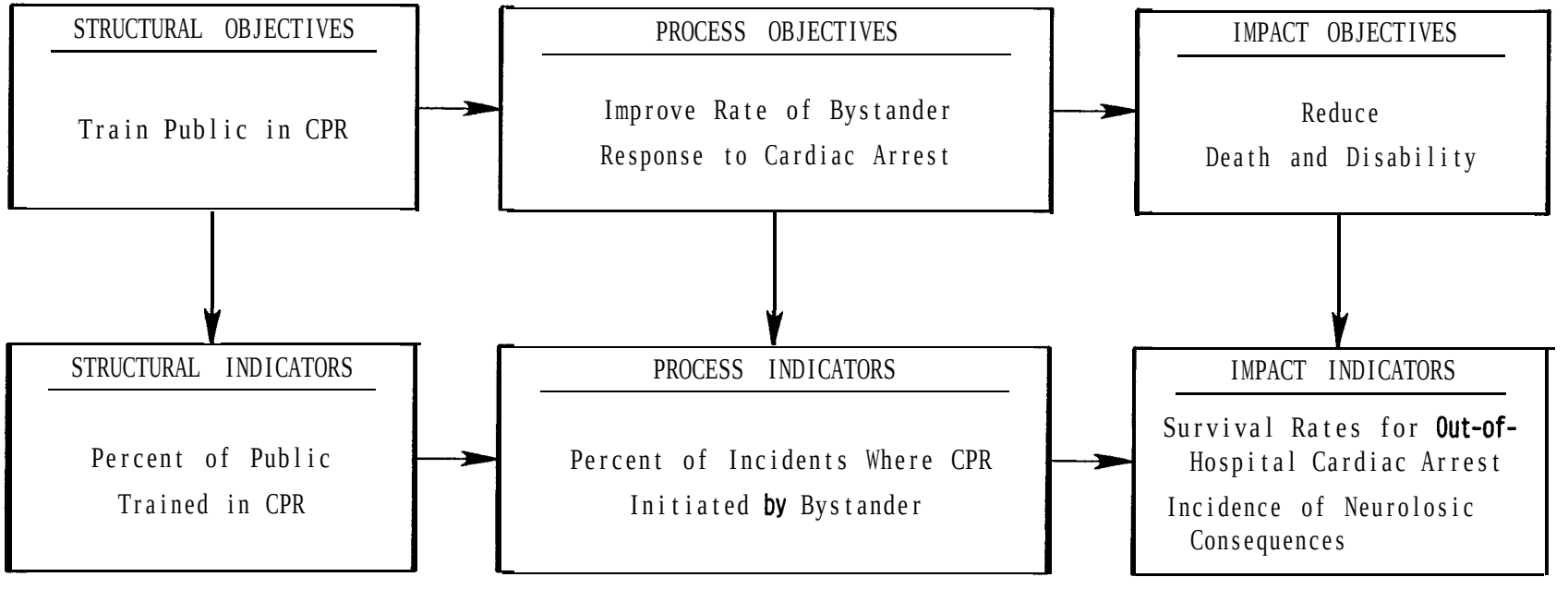
*EMT/DC

Bergner, Seattle-King County Department of Public Health

FIGURE III-11

PUBLIC INFORMATION AND EDUCATION

IMPACT MODEL



Cobb, University of Washington

FIGURE III-12

Some of the research is assessing specific EMS requirements. For example, telemetry is required in an ALS system, but is expensive and can be difficult to maintain. Research by Cayten is examining the effect of telemetry on ALS care on survival rates, and whether training of EMS personnel would be an adequate substitute.

There are numerous studies examining EMS manpower and training. Pozen has examined the effectiveness of advanced EMT's versus basic EMT's in delivering pre-hospital care to cardiac patients in rural areas. Preliminary results show that increased experience may not be related to the higher incidence of correct diagnoses of the advanced EMT's. Sechrest has been involved in developing methods to assess EMT performance that include indicators of what training, experience and types of individuals are needed to provide quality care.

NCHSR has sponsored research on the effect of categorization on clinical outcomes (Gustafson) as well as on methods to categorize hospital care and to assess and improve the quality of care provided in emergency departments (Gibson). A method of categorization by clinical capabilities has been developed by the Salguero et. al. and applied in a section of Pennsylvania.

Other ongoing research includes the effect of an EMS system (at various levels) on improving cardiac care in rural areas (Pozen), an assessment of trauma registry data (Gelfand) and burn registry data (Cornell). Abstracts of the studies sponsored under NCHSR are provided annually. Much of the NCHSR research has been important and useful to the field. However, it has not been the objective of this evaluability assessment to evaluate NCHSR in terms of overall relevance to EMS needs and interests, but rather to outline NCHSR projects that may be relevant to EMS program analysis.

e. Other Research

There is a substantial body of EMS research that has been completed or is in process. Some of the research has been accomplished by indivi-

duals within the EMS programs themselves to attain information on their own system, to present findings that would assist in obtaining funds, to make a case to local authorities (i.e., establish categorization of hospitals), *or* to submit findings to the field. Additional studies have been generated by individuals involved in EMS, but not necessarily directly affiliated with the programs, such as hospital personnel or police. Many of the EMS physician consultants have contributed to the field of research.

This evaluability assessment has been directly interested in studies that have attempted to deal with program impact. Although there has been no national impact evaluation, there have been outcome studies, locally done, that have attempted to deal with the impact of particular components or critical care areas on reducing death and disability.

The West and Trunkey study suggested that "survival rates for major trauma can be improved by an organized system of trauma care that includes the resources of a trauma center." Death certificates, coroners' reports and autopsy data from Orange and San Francisco counties were examined and classified by CNS and non-CNS related preventable deaths. The results showed that Orange County, which delivered patients to the nearest receiving hospital, had a larger number of preventable deaths and the victims were generally younger than in San Francisco County, where victims were taken to a trauma center.

Boyd's studies with the Illinois Trauma System showed a significant decrease in vehicular deaths after the trauma system was in place.

Mullner and Goldbert did a longitudinal study in Illinois which compared two years prior to trauma system implementation to two years after implementation and noted a decrease in the mortality rate.

The Office of Emergency Medical Services and the Orange County Medical Association co-sponsored a study to assess the possible impact of a trauma system on patient care. Thirty-one percent of 64 deaths reviewed were determined to be potentially salvageable. The study was used as a basis for recommending designation of trauma centers.

The following impact model has been based on these trauma studies. Again, the structural objectives are to get the systems in place (trauma centers); the process objectives are to get victims to the systems; the impact objective is to reduce death and disability. Indicators that structure, process and impact objectives have been met are listed below the respective objectives.

These studies, although done locally, can be duplicated in other systems. In a later chapter, System Sciences, Inc. presents an evaluation option that is partially based on these studies.

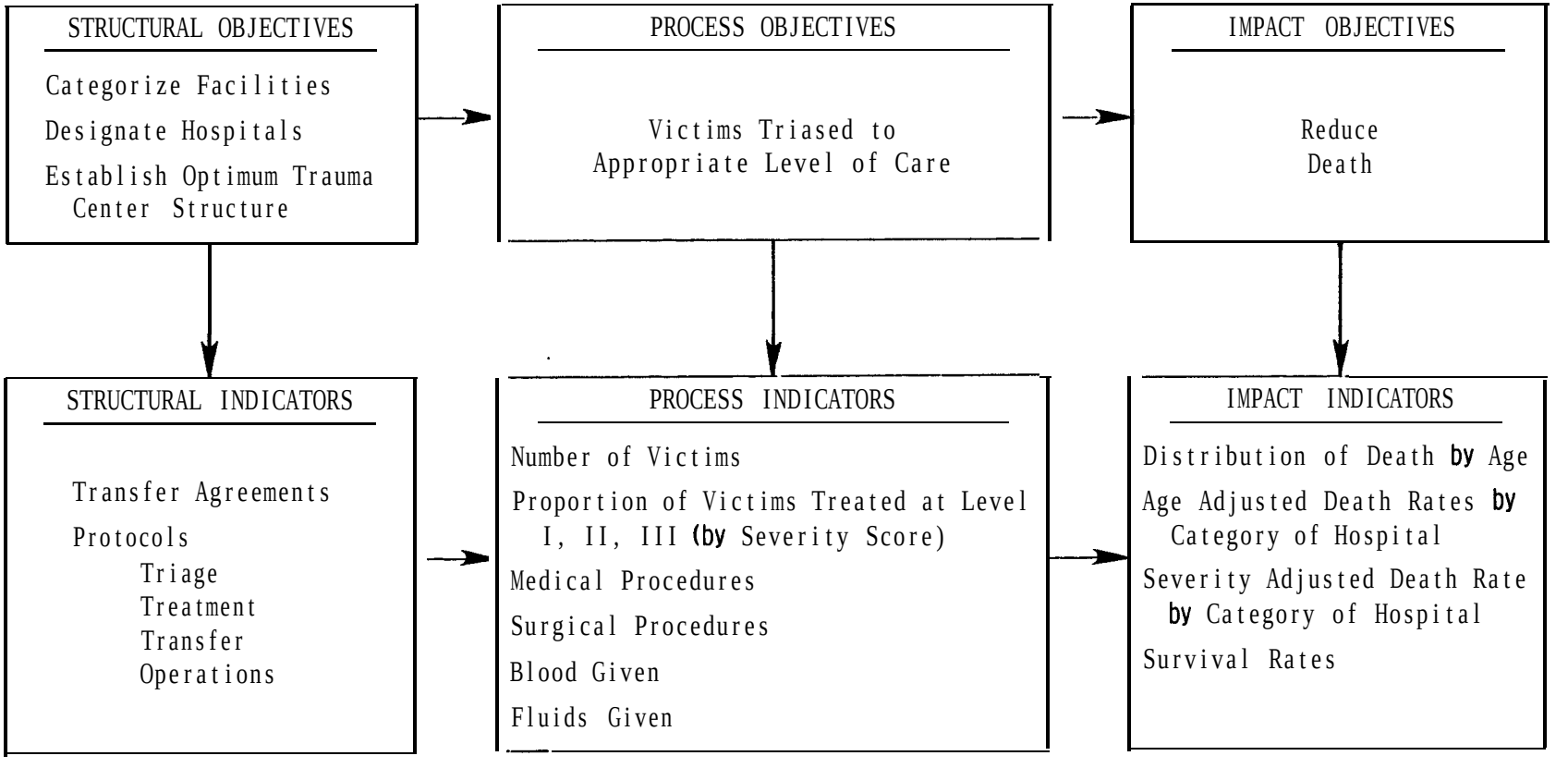
2. Current Strategies

DEMS is cognizant of the lack of a nationally coordinated data effort. Additionally, the importance of impact or outcome evaluations has long been an issue surrounding DEMS and will remain so until a reduction in death and disability is demonstrated.

Currently, DEMS has developed and is testing a means for a coordinated data effort through the Regional Emergency Medical Management Information System (REMMIS). (A discussion of REMMIS is provided in Chapter V). REMMIS will be implemented at the EMS program level, and will provide a data base for grant monitoring, technical assistance--and evaluation purposes. Feedback will be provided to Congress, The administration, HHS Regions, states and programs. The data requirements will be tested and explicitly defined before being distributed to the programs. Through REMMIS, DEMS plans to begin a comprehensive evaluation of the program which will include EMS program outcome.

CATEGORIZATION

IMPACT MODEL



OEMS and Orange County Medical Association
Boyd, Illinois Trauma Program
Mullner and Goldberg, Illinois Trauma System
West, Trunkey, Lim, Orange and San Francisco Counties

FIGURE III-13

IV, ASSESSMENT OF PERCEIVED PROGRAM OBJECTIVES

This chapter will review the following:

- o Respondents' program understanding,
- o Respondents' perceptions of major program objectives, and
- o EMS program logic (respondents' causal assumptions).

The information obtained during the EA interviews serves as the basis for this discussion. The focus will be on the perceptions of representatives of the following levels: Congress; OMB; HHS (Office of the Assistant Secretary for Health) PHS;HSA; DEMS; and the EMS systems.

The existence of significant differences (or agreements) in perceptions will be reviewed; subsequently, the specific information needs will be identified. This analysis will provide the foundation for the suggestion of evaluation and management options as required in the task order.

During the EA interviews, project staff elicited information on a variety of topics. Two key sets of information were given careful attention. First, each respondent was questioned about their understanding of the EMS program objectives. Secondly, each respondent was asked what he or she perceived to be the major activities of the EMS program. From this latter series of questions, we were able to discern the respondents understanding of the program.

Figure IV-1 on the following page provides a summary of the understanding of the EMS program evidenced by representatives at the different levels. The following questions were asked of each respondent:

- o Are you familiar with EMS program requirements in the 15 component and critical care areas?
- o Are you familiar with the seed money strategy for the EMS program?
- o Are you aware of the data available on EMS programs?
- o Are you familiar with the current issues in EMS?

PROGRAM UNDERSTANDING

	15 Components	Critical Care Areas	Financial Viability (Seed Money Strategy)	Reporting/ Information Available	Program Issues.
QUESTION	Are respondents familiar with program requirements in the 15 component and critical care areas?		Are respondents familiar with the seed money strategy for the EMS program?	Are respondents aware of the data available (or lack of it) on EMS programs?	Are respondents familiar with the issues in EMS?
Congress	Limited	Limited	Limited	Limited	Limited
OMB	Limited	Limited	Specific Interest	Limited	Limited
HHS	Limited	Limited	Limited	Limited	Limited
PHS	Limited	Limited	Specific Interest	Limited	Limited
HSA	Limited	Limited	Specific Interest	Limited	Limited
BMS/DEMS	Detailed	Detailed	Detailed	Detailed	Detailed
RO	Detailed	Detailed	Detailed	Detailed	Detailed
REMS	Detailed	Detailed	Detailed	Detaiied	Detailed

KEY: Detailed -- Knowledge of program objectives, activities, issues.

Specific Interest -- General knowledge of program objective, specific interest in issue, little knowledge of activities.

Limited -- Little knowledge of program objectives, activities, issues.

FIGURE IV-1

In most instances, detailed knowledge on each of these questions was found at the level of DEMS and below. At the levels above DEMS, only limited or general awareness was found.

Questioning respondents about the major objectives for the EMS program revealed three different areas of focus:

- Reduction of death and disability,
- Using a seed money strategy to develop a wall-to-wall network of financially viable EMS systems, and
- Operational objectives (system development and implementation).

Figure IV-2 illustrates how each of those interviewed perceived the objectives for the EMS program. From a review of this matrix, a number of points emerge:

- At the levels above DEMS, the major objectives for the EMS program are perceived to be the reduction of death and disability and the development of financially viable systems.
- At the level of DEMS and below, these same objectives are perceived. However, greater emphasis was often given to the achievement of operational objectives. This was especially true as project staff proceeded in interviews from the level of DEMS down to the individual EMS systems.

At times, some respondents would cite all objectives as equal in importance; for others, a single objective would be of greater concern. In general, a program logic emerged which is shown in Figure IV-3. The primary causal assumption for the EMS program holds that: Developing EMS systems (operational objectives) will lead to a reduction in death and disability and achievement of financial viability (outcome objectives).

A second causal assumption also emerged and is illustrated in the logic model. This assumption holds that: Certain system activities relate more directly to the reduction in death and disability; these activities include: manpower and training, communications, transportation, facilities (categorization/designation) and development of protocols and agreements.

In the following sections, more discussion of the above findings is provided.

PERCEIVED PROGRAM OBJECTIVES

ECHELON	RANKING OF PERCEIVED PROGRAM OBJECTIVES
Congress	1. Reduction in death and disability. 2. Achievement of network of financially viable systems.
OMB	1. Achievement of network of financially viable systems.
HHS and PHS	1. Reductions in death and disability. 2. Achievement of network of financially viable systems.
HSA	1. Reduction in death and disability. 2. Achievement of network of financially viable systems.
BMS and DEMS	1. Reduction in death and disability. 2. System development and implementation (operational objectives). 3. Achievement of network of financially viable systems.
Regional Office	1. Reduction in death and disability. 2. System development and implementation (operational objectives) 3. Achievement of financial viability.
EMS Systems	1. System development and implementation. 2. Achievement of financial viability. 3. Reduction in death and disability.

FIGURE IV-2

LOGIC MODEL

EMS SYSTEM DEVELOPMENT AND IMPLEMENTATION

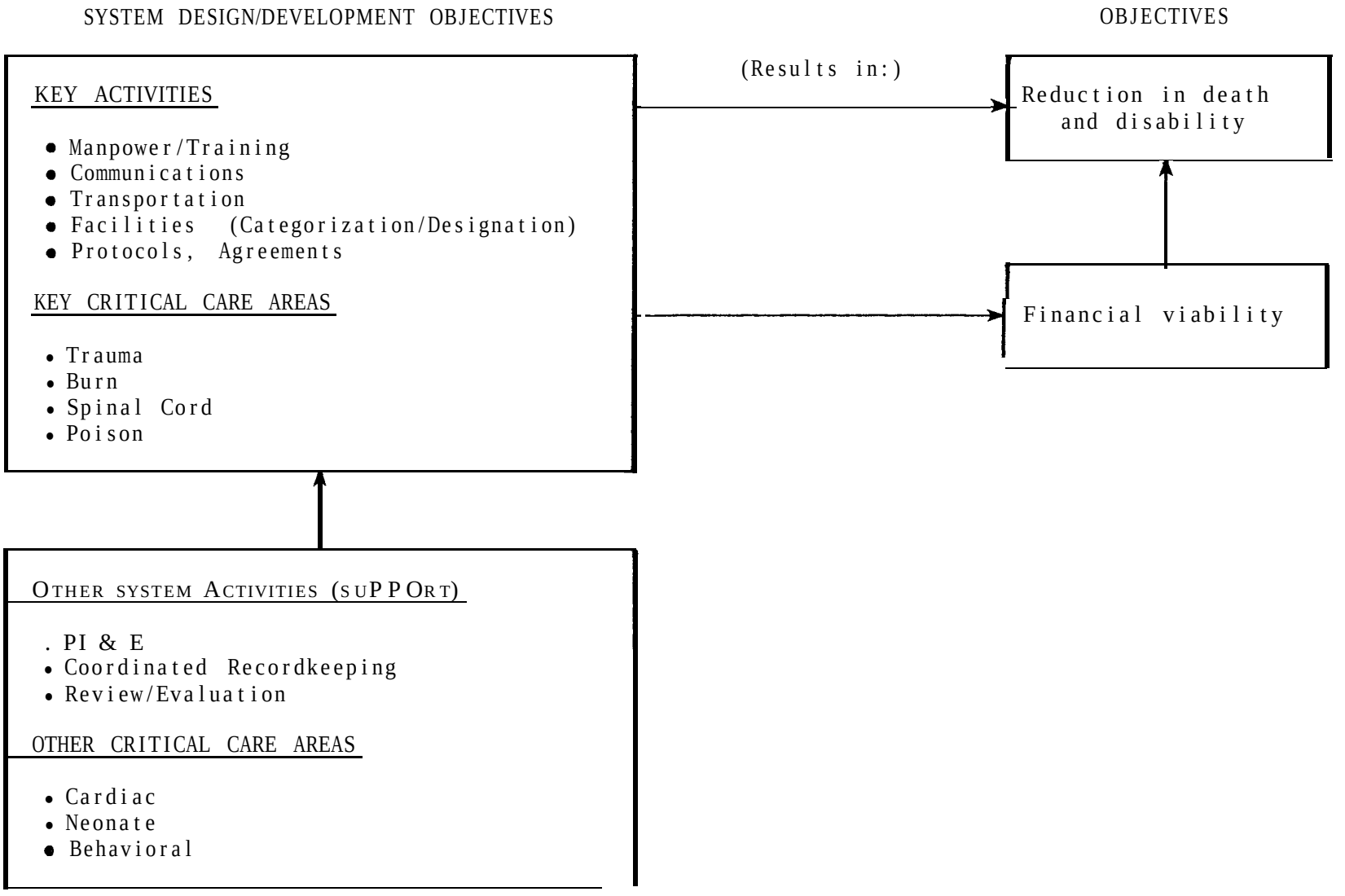


FIGURE IV-3

A. THE REDUCTION IN DEATH AND DISABILITY

Virtually all of those interviewed perceived the reduction of death and disability as a major objective of the national EMS program. Many respondents at the EMS systems level indicated though that they were most concerned with the more immediate objectives of system design and implementation (operational objectives) and establishing system financial self-sufficiency.

There was general agreement with the programs' causal assumption which holds that developing and maintaining EMS systems would lead to a reduction in death and disability and that when this was demonstrated, local financial support would be forthcoming. This program logic was evidenced at all levels from Congress on down.

At the level above DEMS, the reduction of death and disability was cited as the major objective for the program. There was little awareness though of the way in which such reductions could be demonstrated. It was felt that the responsibility for showing positive outcomes as a result of program implementation rested with DEMS.

Within DEMS, the reduction of death and disability is viewed as the raison d'etre for the national EMS program. Showing then, the link between EMS systems development and reductions in death and disability is one of the major concerns for DEMS personnel. It is DEMS that has to report to Congress about the extent to which death and disability are being positively influenced by the EMS program. The fact that this linkage has not been adequately established was acknowledged. It was often noted that "We know we are reducing death and disability, we just don't have it on paper." As the program has matured, and in the face of annual budget cuts, increasing attention has been given to proving that the EMS program is in fact realizing its primary objective of reducing death and disability.

Regional office, state lead agency, EMS system directors and personnel viewed reducing death and disability as a major objective. These respondents were willing to act on the assumption that system development and implementation would lead to reductions in death and disability. Greater concern focused on measuring the extent to which operational objectives and financial self-sufficiency were being realized; however, it was also recognized that more research and informa-

tion on the link between system building and reductions in death and disability was needed. Such information it was felt, would help proponents of EMS better "sell" the program to State, county and local governments. It was often indicated that relying on individual EMS systems for this type of information was not appropriate or feasible. Multi-site research projects working with a uniform protocol were suggested as a means of obtaining sufficient data on the positive association between EMS system implementation and reductions in death and disability.

B. THE SEED MONEY STRATEGY

A second major objective for the national EMS program, as perceived by a majority of those interviewed, is the provision of seed money for the development and implementation of a network of financially viable EMS systems. The assumption has been that this type of Federal involvement would provide a means of demonstrating to the State, county and local governments the feasibility and need for a systems approach to EMS delivery. Implicit in the use of a seed money strategy is the assumption that the appropriate role of the Federal government is the provision of funds for planning and initial start-up activities and that the appropriate funding base for subsequent maintenance of EMS systems should reside at the State level. The use of the seed money strategy is also perceived as a way in which a (wall-to-wall) network of EMS systems could be developed on a national basis.

There was little disagreement with these points of view. Most respondents felt that the appropriate Federal role was in providing seed monies and technical assistance. It was generally agreed that EMS systems needed to eventually be fully funded by the State, county and local governments.

As a result of this point of view, policy-makers and program managers realize that financial viability is an important aspect of any EMS system. Grantees have been required to provide "assurances of support" and specified levels of matching funds have to be met by all grantees. Increasing attention is being given to the ability of systems to become financially self-sufficient as greater numbers of grantees approach the end of the five-year funding cycle.

C. OPERATIONAL OBJECTIVES (SYSTEM DEVELOPMENT AND IMPLEMENTATION)

In order to achieve the previously stated program objectives, DEMS, the regional offices and the regional EMS programs spend their efforts and dollars on building the EMS systems. This is done in progressive steps by implementing the program components and linking them into a coordinated system of emergency care activities.

These activities are explicitly spelled out in published program guidelines, and are the subject of many national and regional workshops and technical assistance efforts. The national program office and the regional staffs assess the progress that regional EMS programs are making in implementing these program building activities during the annual grant review cycle, in routine site visits, and in general one time reports (abstracts) that have been requested. Thus the requirement for the development of components of the EMS system becomes the basis for establishing intermediate operational objectives against which to assess program progress.

In part, the number of respondnets who cited operational objectives as paramount is a function of the fact that the majority of those interviewed held positions in a regional EMS organization. For these individuals, the immediate and primary objectives logically centered on system development, implementation and operation. In the echelons about the regional EMS programs, the objective of system development and implementation was often cited; however, at the higher levels, these objectives were not given as much emphasis. This is understandable; as one proceeds up the hierarchical organization of the national EMS program, the orientation, responsibilities and attitudes of individuals shift. There is less concern with the operational aspects of the program and greater concern with policy and longer-range objectives.

The operational objectives are perhaps best viewed as "intermediate" objectives to be achieved within a fairly well specified period of time. Those at the DEMS level and below were all familiar with the time frame within which these objectives were to be accomplished. In addition, there was considerable agreement at the DEMS level and below as to just what the most important operational objectives were: most often cited were the operational objectives of:

- o Development/implementation of the components,
- o Development of critical care systems, and
- o Progression from BLS to ALS.

For each of these operational objectives, a sub-set of structure, process and performance objectives are evolving as programs establish priorities and grapple with problems in implementation.

It is anticipated by those at the DEMS level and below, that operational objectives will be accomplished within five to six years; however, as will be discussed in the section below on program issues and questions, some disagreement as to the feasibility of this time frame was surfaced during the EA interview process.

1. Development/Implementation of Components

Familiarity with the 15 components was found at all levels; however, detailed knowledge of the components was only found at the DEMS level and below. None of the representatives at levels above DEMS possessed in-depth knowledge of the components, rather, they had a general awareness of the fact that 15 components were specified in the guidelines. For these individuals, there was little concern with the ranking of the components in any order of priority. Nor was there concern expressed for information on the degree to which this sub-set of operational objectives was being realized in the field.

At the DEMS level and below, the components were given added attention. The director of DEMS indicated that the components were "tools" which could be used to build the systems, in addition, there was acknowledgement that certain of the components were more critical to system development than others.

Those activities of an EMS systems' operations which relate to direct patient care service delivery are of paramount importance to managers from DEMS on down. This fact has been made clear by the amount of attention paid to these activities of the program. It was often noted that the activities which appear to relate directly to reductions in death and disability are: manpower/training; communications; transportation; facilities (categorization/designation); protocols, transfer and mutual aid agreements.

What appears to have happened is that the primary causal assumption for the program has been increasingly focused and narrowed as the program has

matured. Thus, in actuality, the assumption that system development incorporating 15 components and 7 critical care areas would lead to a reduction in death and disability, has undergone revision. The change has brought about a causal assumption very similar to the initial assumption, but one which is more specific and limited. It is this: If a system is implemented which successfully develops and integrates manpower/training, transportation, communications, facilities, protocols, transfer and mutual aid agreements, a reduction in death and disability will occur.

a. The Program Components -- Structure, Process and Performance Objectives and Measures

As a result of the perceptions discussed above, it is necessary to more carefully analyze the objectives and measures which exist for each of the program components. Consensus was found to exist, from DEMS down to the EMS system level, on these objectives and measures. An effort has been made to analyze structure, process and performance objectives and measures in sufficient detail while not becoming overly-complex. This has required focusing in on those objectives and measures for which greatest consensus was obtained.

In this analysis, the primary focus is on those activities which influence direct service delivery. These activities include: manpower/training; transportation; communications; protocols; transfer agreements; facilities; and public safety agencies, Limited attention is given here to those "support" activities which may enhance the effectiveness of the system but are perceived as not having a measurable impact on service delivery. These activities include: review and evaluation, public information and education; mutual aid; disaster planning; coordinated patient recordkeeping, consumer participation, and access to care.

A useful typology for understanding and analyzing the objectives and measures of the EMS program is one which allows clasification by the categories or "types" of structure, process and performance. Each system must achieve objectives in each of these categories if sufficient progress is to be realized in the development of comprehensive EMS delivery.

Structural objectives refer to the aspects of organization, system design and resources. Process objectives are those which direct the deployment and utilization of resources, and operations and activities of the system. Performance objectives represent the goals for the organization and operation of the system; simply put, structure and process objectives are the means to an end, performance. Ideally, achievement of structural and process objectives will culminate in the achievement of performance objectives.

For each of the activities reviewed below -- manpower/training, transportation, communications, facilities/critical care, protocols, transfer and mutual aid agreements -- a function model is provided. The models depict the relationships between the structure, process and performance objectives and also show the measures which can be obtained for the objectives.

- Manpower/Training

  As indicated previously, the structure objectives are:

  - To develop standardized training/continuing education programs,
  - To develop standardized curriculums,
  - To develop formalized certification/recertification and de-certification processes.

  The selected measures for these objectives are:

  - Listing of programs available,
  - Existence of formal certification/recertification/de-certification process.

  The key process objectives for manpower and training activities are:

  - Recruitment and training,
  - Certification, recertification and de-certification.

Selected measures for the process objectives are:

- o Number and percent trained personnel, by type, per year.
- o Percent of need met per year.
- o Number, percent and type of personnel certified, recertified, decertified per year.

For manpower and training, the key performance objectives are:

- o 24 hour, 7 day EMS coverage
- o With at least
  - 2 EMT-A's-BLS
  - 2 EMT-I or EMT-P's-ALS

  on every ambulance run.

Selected measures of the performance objectives include:

- o Number and percent of facilities with 7 day, 24 hour EMS capability.
- o Number and percent of ambulance runs with at least
  - 2 EMT-A's-BLS
  - 2 EMT-P-ALS.(EMT-I's or EMT-P's-ALS)

Figure IV-1 provides the function model for the manpower/training activities.

b. Transportation

The structure objectives for the transportation activities encompass:

- o Development of EMS vehicle placement strategy,
- o EMS vehicles meeting national (GSA) specifications,
- o Ambulances equipped with essential equipment (ACS criteria)

The selected measures for these objectives are descriptive and straightforward.

- o Existence of placement strategy
- o Number, percent and types of EMS vehicles meeting national specifications,
- o Number and percent of ambulances with essential equipment.

Process objectives address the utilization of EMS vehicles and include:

- o Deployment of EMS vehicles,
- o Transport by EMS vehicles which meet national specifications,
- o Transport by ambulances with essential equipment.

The measures of the process objectives for transportation include:

- o Proportion of the population within
  - 30 minutes maxiumum, rural
  - 6-8 minutes avergage, urban
- o Number and percent of EMS transports in vehicles meeting national specifications,
- o Number and percent of ambulance runs with essential equipment on board.

Transportation performance objectives include:

- o EMS vehicle placement permitting for 95 percent of all calls
  - in rural areas-a maximum of 30 minutes response time
  - in urban areas-an average of 6-8 minutes response time

Performance measures are:

- o Number, percent of EMS vehicle runs with response times of
  - in rural areas-a maximum of 30 minutes
  - in urban areas-an average of 6-8 minutes

Figure IV-Z provides the function model of transportation activities.

c. Communications

A variety of activities in communications are crucial to the development of effective EMS systems. Activities occur in the areas of access, dispatch and medical control. Figures IV-3 through IV-5 provide the function models for these activities.

1) Access

The structural objectives for access are:

- o Establish 911 or other single access number
- o Provision for access by population with auditory handicap and by population which is non-English speaking (multi-lingual access capability).

Structural measures are:

- o Existence of 911 or other single access number.
- o Existence of access for population with auditory handicap and for non-English speaking population.

The process objectives include:

- o Comprehensive coverage of the population/geographic area by 911 or other single access number.
- o Provision of access for population with auditory handicap and for non-English speaking.

Measures of the process objectives are:

- o Percent of population with 911 or other single access number.
- 0 Percent staff time for provision of multi-lingual access.

The key performance objective is:

- o Utilization of 911 or other single access number.

The selected measure of this objective is:

- o Number and percent of calls and subsequent dispatches handled through 911 or other single access number.

2) Dispatch

For the dispatch activities, the key structural objective is:

- o Central or centrally coordinated dispatch.

The measure of this structural objective is:

- o Existence of designated central/centrally coordinated dispatch.

The process objective is:

- o Dispatch of EMS vehicles through central/centrally coordinated unit.

The selected measure of this objective is:

- o Types, number and percent of EMS vehicles centrally dispatched.

Performance objectives for dispatch are closely related to the objectives for transportation. Of paramount concern is reduced response time; since the measure for this has been developed for the transportation activities, it has not been repeated here. Information captured regarding transportation performance coupled with information on the structure and process objectives for dispatch, will provide a satisfactory indication of the dispatch system's functioning capability.

3) Medical Control

There are two key structural objectives for medical control:

- o Direct cortmunications between mobile units, resource and receiving facilities
  - In BLS-Basic Voice
  - In ALS-Basic Voice and Telemetry

- Development of medical control protocols.

The measures are:

- Types, number and percent of EMS vehicles with direct communications
  - In BLS-Basic Voice
  - In ALS-Basic Voice and Telemetry
- Existence of medical control protocols.

The process measure for medical control is:

- Exercise of medical control.

The measure for this is:

- Number and percent of runs with medical control exercised.

The performance objectives for medical control are closely related to those for facilities and protocols. Essentially, the analysis of "compliance" with triage, treatment transport and transfer protocols will yield an adequate indication of the extent to which effective medical control is being exercised within the EMS system.

d. Facilities/Critical Care

The structural objective for these activities is:

- The development of vertical and horizontal categorization plans
  - for emergency departments
  - for critical care units/centers.

The measure is:

- Existence of verticle and horizontal categorization plans.

The process objective is:

- o Designation of Facilities
  - resource, receiving facility
  - critical care unit/center

The process measures are:

- o Type, number and percent of facilities categorized and designated.
- o Type, number and percent of facilities not categorized.

The performance objective is:

- o Handling of emergent patient in each of the critical care areas at the most appropriate facility.

Performance is measured by:

- o Number and percent of patients matched with appropriate facility by critical care area (Compliance).

Figure IV-6 provides the function model for the facilities/critical care activities.

e. Protocols, Transfer and Mutual Aid Agreements

Structural objectives include:

- o Development of Transport, Triage and Treatment Protocols.
- o Development of Transfer Agreements
  - physician-to-physician
  - hospital-to-hospital, etc.
- o Development of Mutual Aid Agreements.

Measures for structure are:

- o Existence of Transport, Triage and Treatment Protocols.
- o Existence of Transfer and Mutual Aid Agreements.

Process objectives include:

- 0 Promulgation, implementation of the protocols.
- 0 Promulgation, implementation of transfer and mutual aid agreements.

The measures of process are:

- o Number and type of formalized protocols.
- o Number, percent and type of facilities having transfer and mutual aid agreements.

Performance objectives are:

- o Triage, transport and treatment according to established protocols.
- o Transfer of patients in each of the critical care areas to the appropriate facility.

Measures of performance are:

- o Number and percent of patients triaged, transported and treated according to protocol in each of the critical care areas.
- o Number and percent of patients transferred
  - to a higher level facility
  - to a lower-level or step-down facility.

Figure IV-7 provides the function model for these activities.

FUNCTI ON MODELS

FIGURES IV-l THROUGH IV-7

MANPOWER/TRAINING -- FUNCTION MODEL

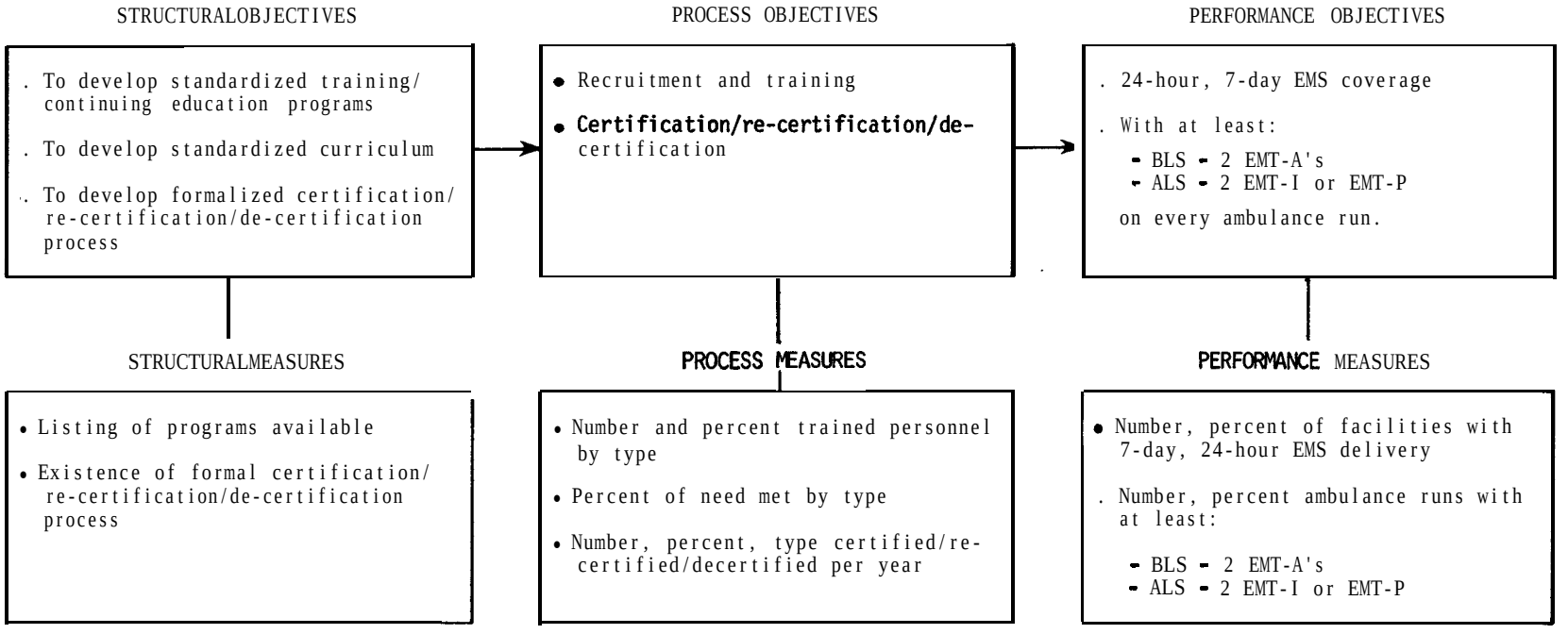


FIGURE IV-1

TRANSPORTATION -- FUNCTION MODEL

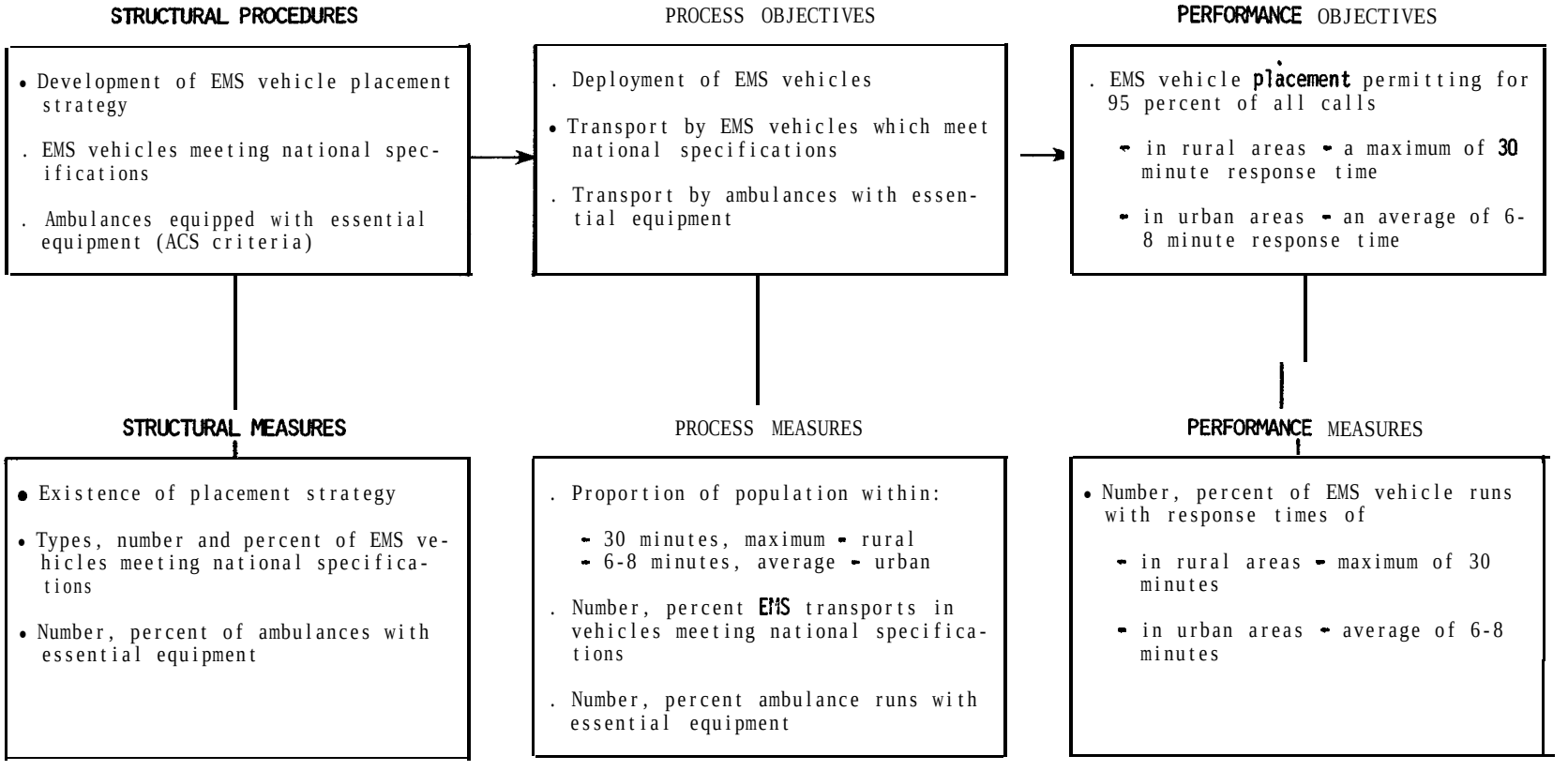


FIGURE IV-Z

COMMUNICATIONS - ACCESS

FUNCTION MODEL

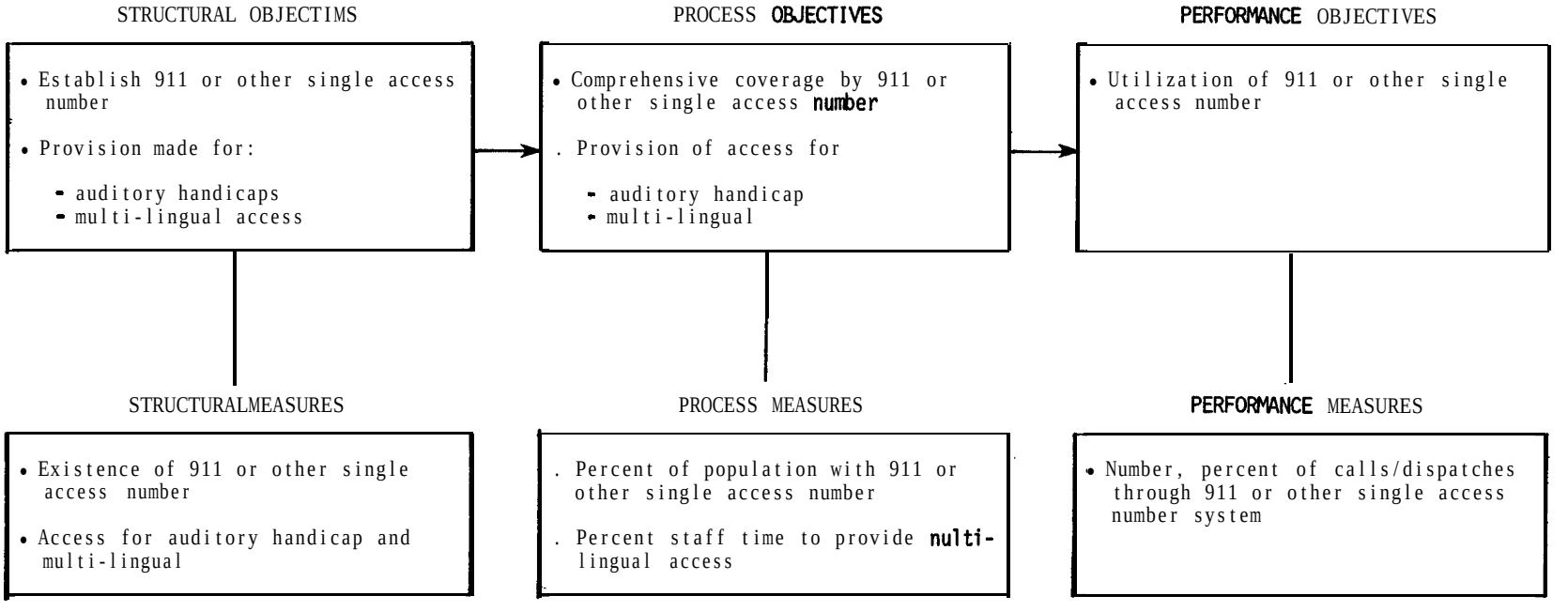


FIGURE IV-3

COMMUNICATIONS - DISPATCH

FUNCTION MODEL

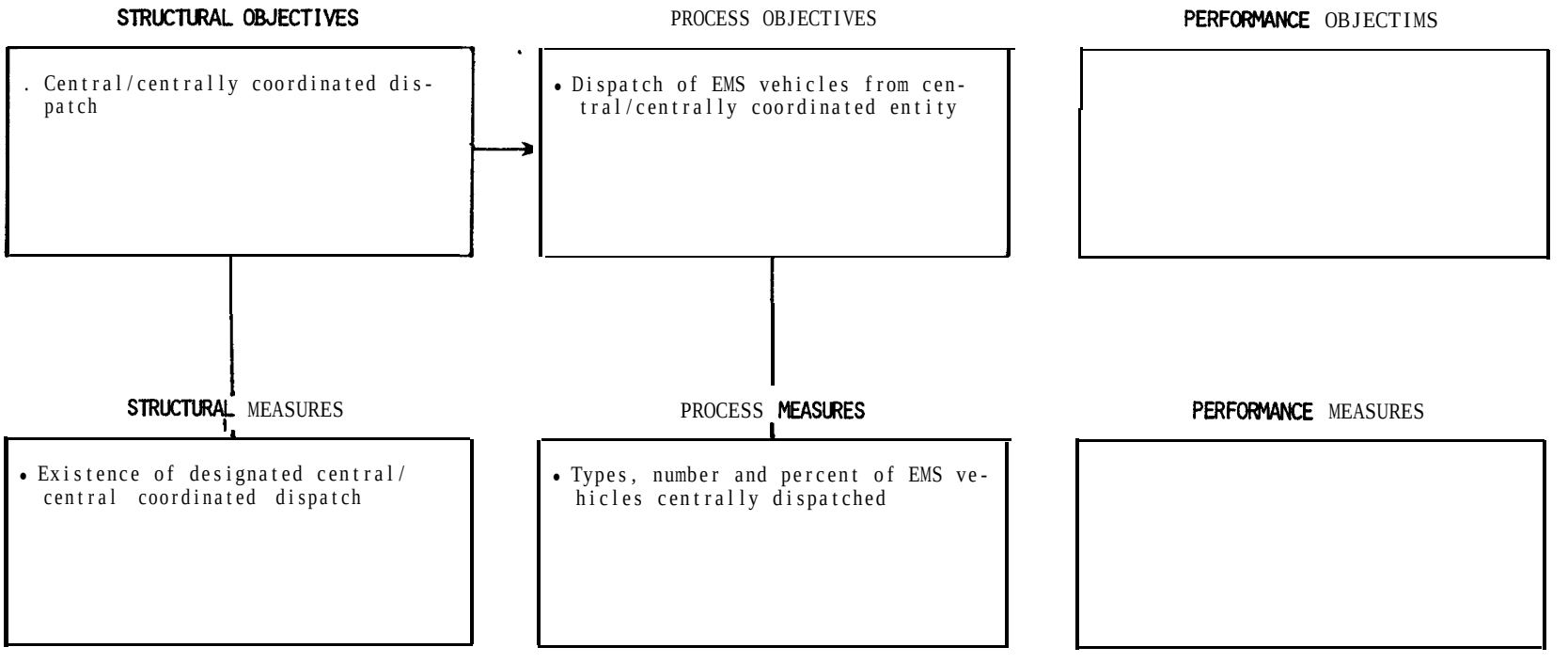


FIGURE IV-4

COMMUN I CAT1 ONS - MEDICAL CONTROL

FUNCTION MODEL

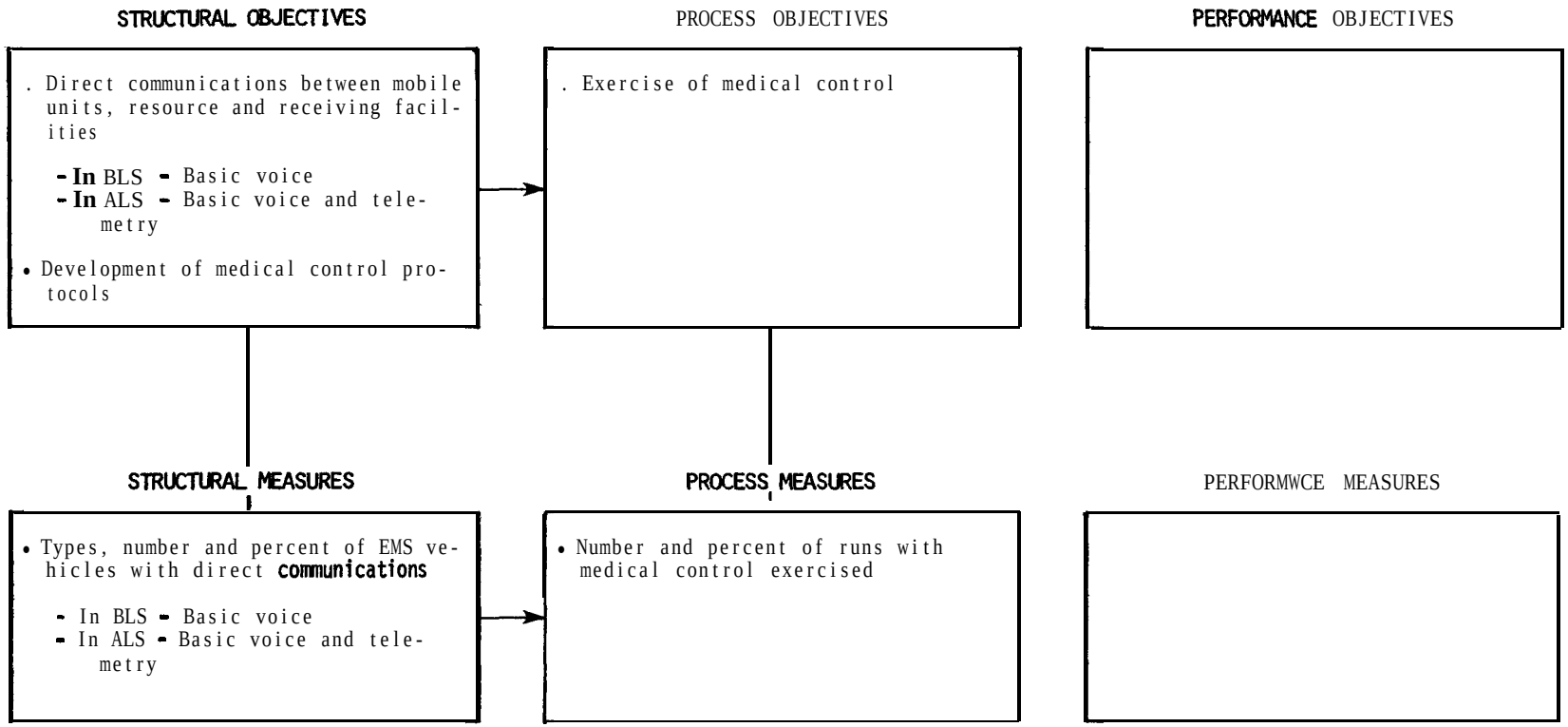


FIGURE IV-5

FACILITIES/CRITICAL CARE

FUNCTION MODEL

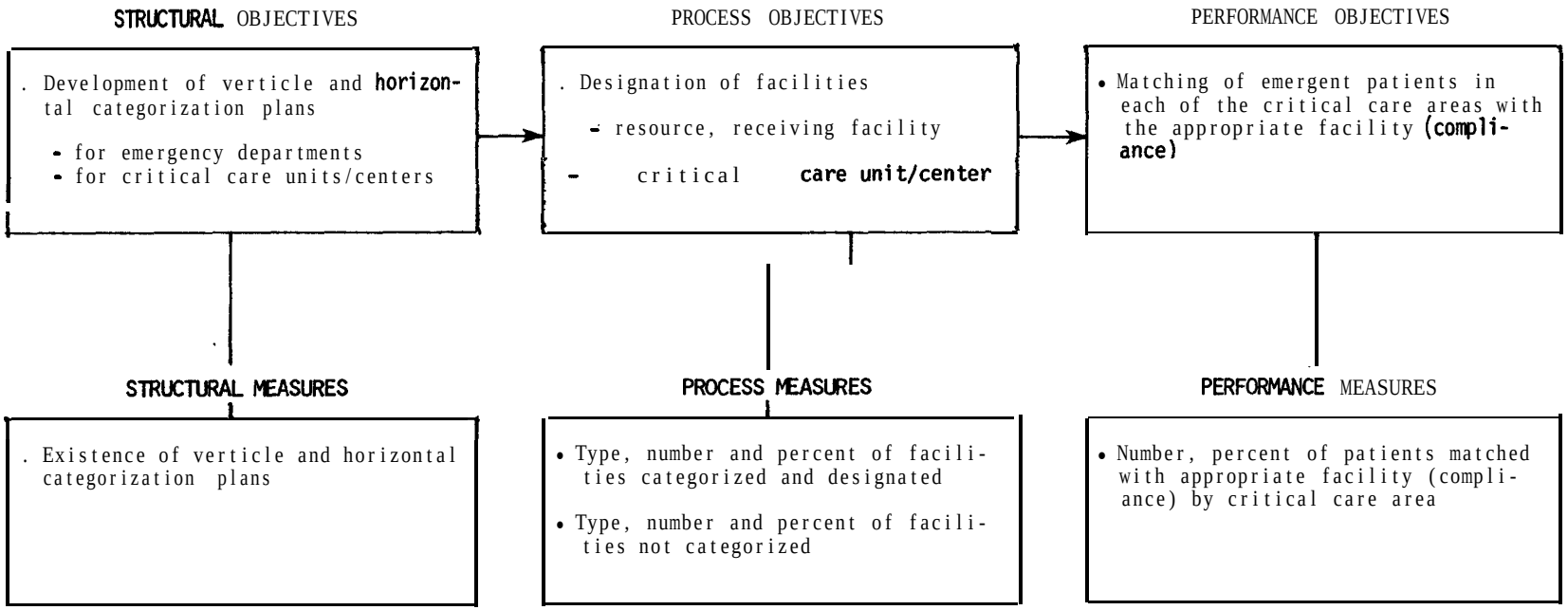


FIGURE IV-6

PROTOCOLS, TRANSFER AND MUTUAL AID AGREEMENTS

FUNCTION MODEL

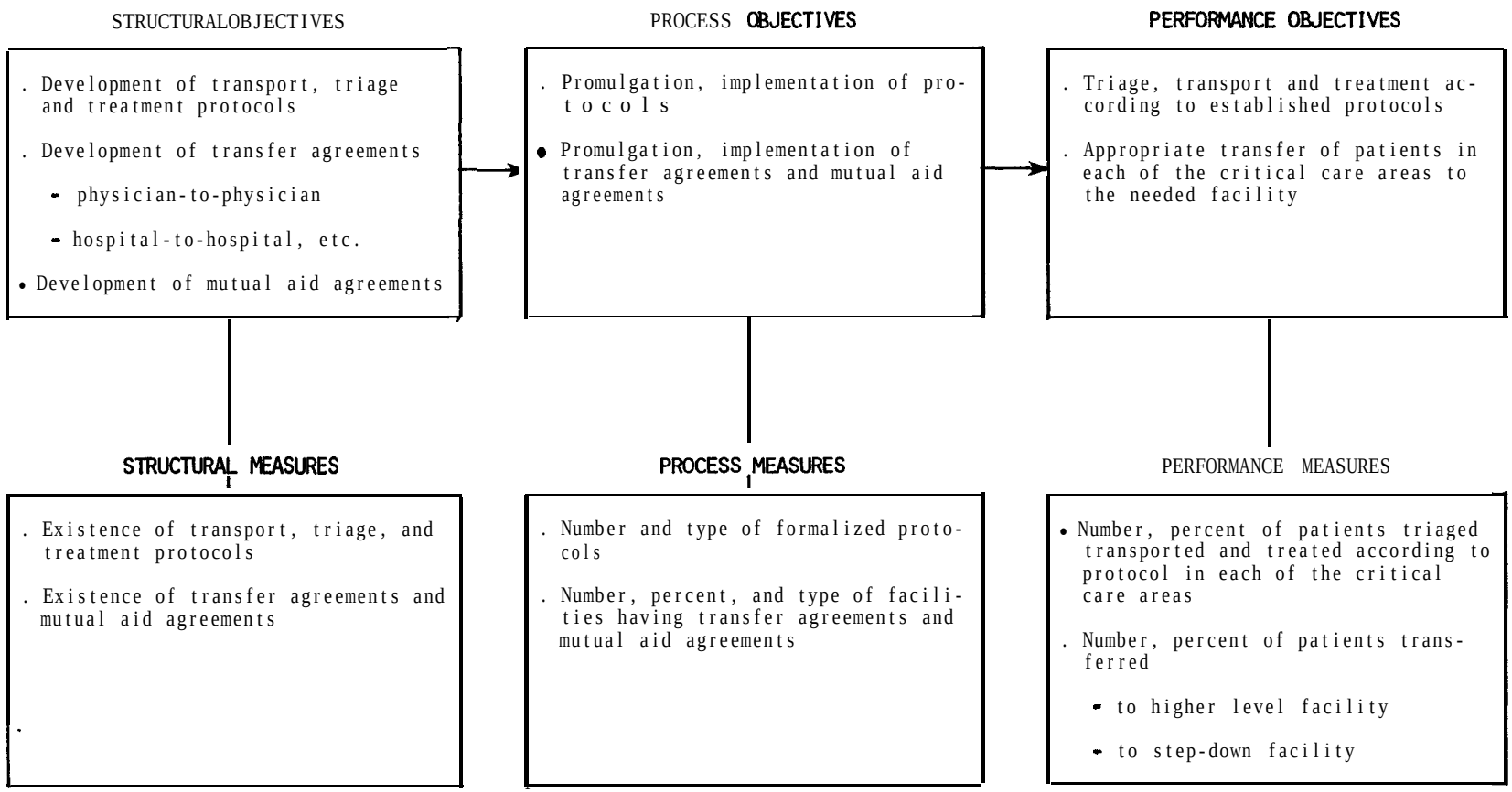


FIGURE IV-7

Performance objectives focus on the correct utilization of the protocols and appropriate transfer of patients within the system (either to higher or lower level units/centers). Figure IV-10 provides the function model for protocols, transfer agreements and mutual aid.

In summary then, the emphasis given to these components -- especially at the EMS system level -- stems from a variety of factors:

- o System directors. and personnel perceived a distinct emphasis on these components on the part of the DEMS especially in the early stages of the programs' implementation.
- o System directors and personnel feel that these components relate most directly to effective patient access, treatment and transport.
- o System directors and personnel perceive that these components, affecting service delivery as they do, relate more directly to reductions in death and disability than do the other components.

At the EMS systems' level, the development/implementation of these components is a task of high priority especially in the early stages of the grant cycle. It was frequently expressed at the EMS system level that selected measures of the degree to which these components were being effectively implemented would provide good insight into the adequacy of system performance.

2. The Critical Care Areas

As with the components, detailed knowledge of the requirements for the development and implementation of systems for seven critical areas, existed only at the DEMS level and below. Those above the DEMS level had little awareness of the seven critical care areas the EMS systems were supposed to address. As a result, little knowledge was evidenced by those above DEMS on the objectives for the critical care areas.

At the level of DEMS and below, the critical care area receiving the greatest attention is trauma. It was often stressed that the greatest and most measurable impact of the EMS program will be in the treatment and man-

agement of trauma patients. This patient population is considered to be larger than those patient populations in the other critical care areas. Most respondents felt that assessing outcomes in trauma would provide an adequate indication of the achievements of the national EMS program. Additional perceptions included:

- o One perception (not frequently encountered in the field, but articulated at DEMS), was that if the trauma system was developed and effectively implemented, the other systems would probably fall into place. Since the development of the trauma system requires a great deal of local negotiation, planning and coordination, it is assumed that if trauma is well-implemented, the other systems will be more easily developed subsequently.

- o Burn and spinal cord cases are more readily referred to more appropriate, higher-level treatment centers. A common perception was that practitioners more often accepted the fact that such transfers or referrals in these cases were indicated than in trauma cases.

- o Neonate and cardiac care has been addressed by the efforts of Federal and private agencies; these cases are perceived by the majority of those interviewed as being somewhat more adequately handled.

- o Behavioral cases are handled by area mental health systems and great difficulty in meshing the EMS system resources with those of the mental health system has been encountered.

- o Poison information and treatment systems have not received much attention due to limited resources, expertise and leadership. In several of the systems visited, poison was perceived as a step removed from their current concerns.

At all levels then, from DEMS on down, general congruence exists regarding the critical care areas. Trauma receives the greatest attention at all levels. At DEMS, burn, spinal cord and poisoning have received varying amounts of attention through the funding of demonstration projects in these areas. At the EMS systems' level, critical care plans are developed for all of the seven critical care areas, however, it was consistently acknowledged that the primary emphasis should be given to the trauma critical care area since this would be the most difficult to implement and would be likely to have the greatest and most measurable impact.

3. BLS/ALS

EMS systems which progress through five funding cycles are expected to evolve from systems providing Basic Life Support (BLS) to ones which have the capability for providing Advanced Life Support (ALS). (See Chapter III Section B for the discussion of the distinction between BLS and ALS.) This objective was most clearly articulated at the level of DEMS indeed, the program guidelines specify this type progression as requirements for continued funding.

At the EMS systems' level, this objective was held by those interviewed however, concern was expressed that some areas could not support ALS systems. This appeared to be especially true in areas with an urban/rural or urban/wilderness configuration. In these regions, great distances, scattered population, paucity of training sites and of EMS jobs has meant that a reorientation in objectives has had to take place. Basically, the objective of achieving ALS is held for urban/suburban areas and accomplishing adequate BLS has been the objective held for parts of the system in more rural or wild areas.

D. ISSUES IN EMS SYSTEMS DEVELOPMENT, SERVICE DELIVERY AND EVALUATION

Through a review of the documentation about emergency medical services (research reports, reports to Congress, journal articles, technical assistance and program documents) as well as through the series of interviews and discussions conducted by the EA project staff, it has become evident that a number of recurring issues influence the development of EMS systems, EMS service delivery and evaluation. In terms of the number and variety of EMS systems nationwide, the group of programs visited and the staff interviewed, exposure to the total EMS program by the EA project staff was indeed limited. However, certain issues were repeatedly mentioned -- in the formal interview process, in informal discussion, in the documentation -- and it is felt that a certain degree of concensus exists. The issues raised during the course of this study may be generalizable to the national program and are therefore worth noting.

The issues and concerns articulated in the documentation and during the course of the study are catalogued below. This is in no way to imply that significant and positive momentum and progress has not been brought about through the efforts of all concerned. Rather, it is recognized that these issues and concerns must be addressed by any plan which has the objective of improving program management and performance.

The areas in which most concern has been expressed focus on program organization and management and on the components of manpower/training, communications, transportation, facilities, critical care plans, evaluation, coordinated patient recordkeeping and public information and education.

1. Program Organization and Management

Issues surrounding program organization, financial management and viability and the grant process have been identified in the literature and in the EA study process.

a. Program Organization

Concern about the following issues is evident:

- o Role Clarity -- The impression exists that the national EMS program is run in a tightly centralized fashion and that confusion over delegated responsibility was evident.
- o Federal Policy and Priorities -- The national posture has evidenced shifts as the program has matured over time. Concern was expressed about the dissemination of information on the changes which had occurred.
- o Program Coordination -- Issues of program coordination were found at all levels of the program's organizational structure. Coordination between the Federal agencies with an EMS component has not existed to the degree that many have felt it should. This has also been true about coordination between the DEMS and the PHS Regional Offices, between DEMS and the State lead agencies and EMS regions. Inter-state and intra-state coordination has also been a topic of concern.
- o Program Feedback -- Little or no feedback has been provided by the office of DEMS to the regions, states or EMS programs. Many EMS program staff (at all levels) expressed dissatisfaction about this point. The time spent generating information for the Federal office was not productively spent according to many, since they did not see tangible results of their efforts. The evaluation abstracts not only depleted program resources, the information was not used in the grant review process.

- Program Guidelines -- Ambivilence about the program guidelines was found by the EA project staff. On one hand, lack of specifity in the guidelines was cited as a problem. On the other hand, some concern was expressed about the "tightness" or constraining effects of the EMS system model being supported by the national office.

- Program Technical Assistance -- The workshops, regional and national conferences were recognized as providing useful and timely information for those systems in the early stages of development. Systems in the more advanced stages expressed a need for new technical assistance programs which address the questions and problems arising for these systems.

- Program Authority -- The legal or regulatory authority of the EMS regional programs has been an issue for the EMS program since its inception, Conflicting and/or duplicative laws, statutes, requlations and ordinances create confusion over authority, accountability and control. Concern has also been expressed over the lack of sanctions for non-performance.

- Program Staffing -- The lack of a sufficient number of trained, experienced personnel has created problems at all levels of the EMS organizational structure. High turnover has exacerbated the difficulties brought about by short staffing.

b. Program Financial Management

Issues and problems in the financial management of the EMS program have received attention:

- Program Self-Sufficiency -- Concern was repeatedly expressed about the difficulty of achieving fiscal self-sufficiency. The role of the state and of the local communities in funding an EMS region have not been clarified. The Federal requirements for commitments are perceived as somewhat diffuse; soft matches by communities do not necessarily allow for enough control over such resources by the EMS system. The need for greater Federal guidance and assistance in promoting programs' fiscal self-sufficiency was perceived.

- Program Funding --Theneed for better coordination between funding sources was expressed. Identification of the sources has taken place but many EMS programs remain unaware of the availability of funds and eligibility requirements.

- Financial Recordkeeping -- Consistent standardized funding profiles for all of the grantees are extremely difficult to construct. The historical financial development of the systems has not been tracked or recorded in a central location. Program expenditures by component or clinical area cannot be reconstructed. The only available figures appear to be those submitted in the grant application budget; subsequent streaming of

funds is difficult to assess. This has direct implications for any program attempting to evaluate costs associated with emergency medical service delivery.

c. The Grant Process

The Federal requirements for an annual grant application and the grant review process have been subjects of concern:

- o The Annual Grant Application -- It has been noted that an inordinate amount of EMS program resources are depleted by the Federal requirement for an annual grant application. Much of the information required from one year to the next is repetitive; it was noted that a modified annual application showing achievements and anticipated activities would alleviate some of the burden sustained annually.
- o The Grant Review -- Concern was expressed about the need for a more consistent review process. In addition, the use of technical consultants who themselves are program directors within the region, was a source of concern.
- o Grant Funding -- The uncertainty about the amount and availability of funds from one year to the next has caused difficulties for many of the EMS programs. The uncertainty has often led to high staff turnover and has made it difficult to generate appropriate levels of matching financial support.
- o Grant Data and Information -- The records and data available to many programs are limited in scope, specificity, reliability and validity. Because of this fact, attempting to respond to the Federal grant application requirements is a difficult task.

2. The Program Components and Clinical Areas

The national EMS program focuses on the development of systems which are to address 15 components and 7 clinical areas. Issues about the components and clinical areas have been articulated.

a. Manpower/Training

Four major issues have been evidenced over time.

- o Needs Assessment -- No adequate needs assessment methodology exists for programs attempting to project training needs. Programs have little way of determining "appropriate" levels of personnel.

- o Standardization -- Concern has been voiced about the lack of standardization in training programs, certification, re-certification and decertification procedures. This has had a direct impact on the difficulties encountered by the programs in defining accountability and control.

- o Accountability and Control -- There are issues relating to accountability and control in all dimensions of the EMS program. Questions arise particularly about the roles, responsibilities, and legal obligations of the providers of direct care. It has been expressed that the relationships, in terms of accountability, between providers of care, the EMS program, EMS State lead agency, the individual states and the Federal government, have not been satisfactorily defined.

- o Turnover -- The lack of positions which are acceptably remunerative had led to high turnover for many programs. Volunteer personnel also evidence high levels-of turnover. This difficulty has made quality assurance hard to sustain.

b. Communications

The concerns raised about communications have included:

- o Communications Technology -- Additional clarification on the acceptability of specific technologies is needed according to the views which have been expressed. The coordination between DEMS, DOT and the FCC, in developing a consistent posture would resolve difficulties that are being encountered.

- o Communications Cost Effectiveness -- There are few estimate methodologies available; it is difficult for programs to effectively anticipate maintenance costs for varying System configurations. It is also difficult for programs to project out the costs of implementing and maintaining 911.

- o Uniformity and Enforcement -- Difficulties have arisen when regions have developed communications systems which do not allow for "cross-over" by one EMS vehicle into regions outside its own. This problem exists intra-state and inter-state. It is questioned whether or not some type of greater uniformity could be obtained across systems. Concern was also expressed about the need for identification of an entity which could monitor and enforce appropriate use of the systems.

- o Vendor Influence -- Vendors have significantly influenced the design and implementation of EMS communications systems. Though the need for vendor information is recognized, the extent to which a vendor should influence a communications system design has been questioned.

c. Transportation

Many EMS programs have previously developed transportation systems which need modification as integration into the EMS system evolves. Issues which have been evidenced during this process include:

- o Control and Accountability -- The difficulties of meshing systems of private and public transportation have been of concern to those involved in the program since its beginning. Questions of control and accountability have repeatedly confronted developing EMS programs. This has been a political issue as private sector interests have wished to remain independent; this has made development of placement strategies problemmatic. A whole series of issues have been generated in the areas of dispatch, transport and triage protocols, reimbursement, accountability and quality control.

- o The Roles of DOT and DEMS -- Transportentitiesare often able to receive funds from DOT. This does not always ensure or enhance integration of these entities', activities into those of the EMS system. Acceptance of funds or equipment from the national EMS program implies loss of autonomy to many transport entities. The need for better coordination between the DOT and EMSS programs has been noted.

- o First Responders -- The myriad types of first responders have presented coordination and management problems and the issue of EMS as a third service has been raised recently. The responsibility for treatment and/or transport changes according to the regulations and ordinances of local governments, counties, regions and states. It has been indicated that clarification and standardization in these areas would assist developing EMS programs in achieving a comprehensive transportation system that meets the Federal requirements.

d. Facilities

The facilities component requiring categorization and designation of hospitals has been a difficult component to implement for many developing programs. Issues associated with this component include:

- o Categorization/Designation Methodology -- The process of developing a categorization plan and implementing the plan through designation is one which could be enhanced by the design of a methodological approach. Many programs face difficulties in evaluating the clinical capabilities of facilities for the handling of those emergent patients in the seven critical care

areas. The process of categorization is controversial -- many approaches, from self-categorization to requests for proposals have been tried -- and additional Federal guidelines were felt to be needed.

- o Transport, Triage, and Treatment Protocols -- It was noted that additional guidance in the development of transport, triage and treatment protocols was needed. Physician acceptance and legal obligations monitoring and enforcement of compliance are still issues in need of resolution.

e. Critical Care Plans

Closely related to the issues associated with the facilities component, the issues regarding critical care plans include:

- o Needs Assessment Methodology -- It was noted that a methodology for adequately estimating need in each of the critical care areas has not been sufficiently developed.

- o Designation of Critical Care Units/Centers -- It has been noted that coordination of the designation process is difficult. The decision of which facilities should be upgraded or downgraded and the extent to which this activity will affect utilization patterns are issues facing developing programs.

- o The Critical Care Areas -- The critical care areas of cardiac, burn, spinal cord and neonate are receiving varying degrees of attention by programs across the country. There appear to be few major issues which are negatively influencing the development of these critical care areas. The need for regionalization of care,especially for burn, spinal cord and neonates is well-recognized and meets with little resistence. Most facilities can handle cardiac; non-emergent cardiac (for example, by-pass candidates) are usually referred along established lines.

  The poison critical care area has received significant attention at the national level which is often not reflected at the programmatic level. However, development of this area appears to be progressing smoothly for those programs devoting attention to poison.

  The behavioral critical care area does not appear to be receiving attention from most programs. The reasons for this are numerous, foremost is the difficulty of integrating psychiatric/mental health system resources into the EMS system. Behavioral problems have not traditionally been viewed as an emergency medical problem unless poisoning or physical injury is sustained. Program staff indicated that greater Federal attention and assistance in this area is needed.

The critical care area receiving the greatest amount of attention is trauma. Issues faced by systems developing the trauma critical care plan include:

- Physician and Institutional Resistance - The disruption in utilization patterns, loss of income and prestige are of concern to facilities and practitioners many of whom feel that trauma could be handled locally.

- Need Estimate Methodology - A methodology for proving the need for trauma regionalization has not been adequately promulgated. EMS systems have difficulty documenting the need for a regional system of trauma care.

- Designation Criteria - Closely related to the above concern, the lack of agreed upon designation criteria is an issue in the development/implementation of the trauma plan.

- Impact Measures - One of the crucial issues facing the EMS systems is the lack of agreement on impact/outcome measures and methodology.

f. Evaluation

o Priority for Evaluation -- The issue of what degree of priority should be given to evaluation is one which confronts developing programs.

o Evaluation Capacity -- Most programs suffer a lack of evaluation capacity -- trained personnel, funds and most importantly comprehensive, comparable data.

o Evaluation Data -- Access to data can be limited. Programs do not have clearly defined authority for obtaining certain records and the issue of patient confidentiality compounds the difficulty.

o Evaluation Methodology -- It has been noted that an adequate evaluation methodology has not been imparted to the programs. It is argued that "Tracer" studies which give some indication of compliance do not necessarily reflect decreased death and disability resulting from system implementation. In addition, the lack of adequate severity indices and of other patient data lessens the validity of analyses obtained.

g. Coordinated Patient Recordkeeping

Concern was expressed about the difficulty of designing and implementation of a coordinated patient recordkeeping system. While many programs have access to the document on "Minimum Patient Data," actually getting personnel and facilities to change established recordkeeping systems is very hard to do.

h. Public Information and Education (PI&E)

Uneven commitment to developing and implementing programs of PI&E was evident. Federal technical assistance and resources (information/education campaign packages) has been limited to date. Of concern is the fact that the role of PI&E in generating support for the EMS system and in leading to more appropriate utilization, has not been given the needed attention.

V. ASSESSMENT OF PROGRAM INFORMATION NEEDS AND ANALYSIS OPTIONS

As discussed in the previous chapter, the primary casual assumption which emerged during this E.A. analysis held that the development and implementation of EMS systems would lead to a reduction in death and disability. The reduction in death and disability is viewed as the paramount objective of the national EMS program. An additional assumption is that the federal role in providing seed monies would lead to the development of a national network of financially viable EMS systems. Building EMS systems which integrate activities perceived as directly affecting changes in rates of death and disability (manpower/ training; communications; transportation; facilities (categorization/designation); and protocols, transfer and mutual aid agreements) and which develop critical care plans for trauma, burn, spinal cord and poison patients is viewed as the way in which the two major outcome objectives will be accomplished.

In light of these findings, project staff have been able to determine the information needs which exist:

- o Measures are needed for the analysis of reductions in death and disability. Information on the extent to which the national EMS program is accomplishing its major objective needs to be collected and promulgated to policy-makers and program managers.

- o Data on the financial status of individual systems is needed to provide for the evaluation of the success of the seed money strategy in developing systems on a national basis which are financially viable subsequent to federal funding.

- o Data on system performance is needed for the evaluation of whether system development is proceeding according to prescribed guidelines and specifications.

Figure V-l outlines the program information needs and questions which relate to the perceived program objectives articulated by those interviewed. Also indicated are the options for compiling information on those aspects of the program for which questions have been found to exist.

MATRIX OF

PERCEIVED PROGRAM OBJECTIVES. PROGRAM INFORMATION NEEDS AND QUESTIONS. AND ANALYSIS OPTIONS

Perceived Program Objectives	Program Information Needs and Questions	Analysis Options
• Reductions in death and disability	Are reductions in death rates being effected by the national EMS program? • What is the impact of trauma system development and implementation? • Are changes in death rates occurring in systems without designated trauma centers? • What percentage levels of compliance are acceptable? (Trauma patients live/die in trauma/non-trauma center)	Trauma Impact Studies • Cross-sectional • Longtitudinal/ compliance

Perceived Program Objectives	Program Information Needs and Questions	Analysis Options
• Financial viability	What progress is being made to assure that individual EMS systems will be financially viable when federal funding is completed? • What percentage of the annual budget is provided by DEMS? State? Local? • What percentage of each annual match is hard? Soft? • What percentage of grant funds are used for administration and staffing? • What are the costs associated with the components of manpower/training, transportation, communications, facilities (categorization/ designation)? • What are the costs associated with development implementation of the critical care plans? (esp. trauma). • What percentage of the budget is provided by other agencies?	System Financial Analysis • REMMIS • Grants

Perceived Program Objectives	Program Information Needs and Questions	Analysis Options
• System Development and Implementation	Are the EMS systems being developed and implemented performing adequately? • What percentage of facilities have 'I-day 24 hour EMS delivery? What percentage are designated? • What are the staffing levels on ambulance runs? • What are EMS transport response times? • What percentage/area of population is covered by 911? Has central dispatch been implemented? Is medical control available? • Are protocols, transfer and mutual aid agreements formalized and in use?	Program Performance Profiles • Grants • REMMIS • Selected Measures

FIGURE V-1

The options discussed below are based on, the EA documentation reviews and interview process. These options will assist program managers in answering major program questions. The feedback obtained through the exercise of these options'will help in the assessment of whether policies and guidelines are relevant and overall progress towards national objectives is being achieved.

In the following sections, the following analysis options will be discussed:

- o Trauma Impact Studies
  - Cross-sectional
  - Longtitudinal/compliance
- o System Financial Analyses
- o Program Performance Analyses
  - REMMIS

Included in the discussion will be an explanation of the rationale for the selection (what questions can be answered), a description of the analysis (data to be collected and analyzed).

A. PROGRAM IMPACT

A central EMS policy issue has been whether or not EMS programs are an effective program intervention for the reduction of death and disability. At each policy and program level, managers and other officials consistently expressed recognition of the need to assess the success of the program in terms of its impact on death and disability. Essentially, the plausability of the programs' logic and objectives has to be tested.

Two points of view, consistently held, emerged during this E.A. in reference to the analysis of program impact:

- o Program impact can be assessed through the analysis of trauma system outcomes.

- o An analysis methodology has been in development and with further refinements can be used to examine the impact of trauma system implementation.

1. Trauma Impact Studies-Rationale for Selection

As noted earlier in Chapter IV, the majority of respondents asserted that the greatest and most measurable impact of EMS system development would be in the trauma critical care area. The director and personnel of DEMS repeatedly have indicated that evaluation of trauma impact is the highest evaluation priority, as the evaluation of trauma systems would provide an indication of how the entire system was functioning. This as opposed to an evaluation of other critical care areas where the entire spectrum of system activities do not necessarily come into play.

Studies on cardiac critical care have been previously undertaken; the burn critical care area has a built in evaluation component. Spinal cord critical care is just beginning to receive more attention. The critical care areas of neonate, behavioral and poisoning are receiving varying degrees of attention nationally and have not been considered appropriate areas of focus for the evaluation of the national program. The patient populations in these areas are smaller than that for trauma and system implementation has not proceeded at the same pace across programs. Up until this point, research has focused on the clinical aspects of treatment in higher level facilities. Increasing attention will focus on not only appropriateness of care, but such things as the size and characteristics of the patient population and the impact of a systems approach to pre-hospital care.

For the above reasons, as well as for those reviewed in Chapter IV, focusing on trauma care for the evaluation and testing of the EMS program logic, objectives and impact, is perceived as most appropriate. It was often noted that trauma patients (particularly motor vehicle accident victimes) may be more easily identified and tracked through the various stages of are. This type of tracking has been attempted primarily on a retrospective basis and as will be discussed further, this type of study has met with some difficulties and limitations. The results are thus

subject to certain qualifications. However, in spite of the issues associated with trauma impact studies, additional efforts are most certainly warranted according to the majority of the respondents.

Specifically, trauma impact studies were selected as an analysis option because they will provide sufficient and useable data on the following questions:

- o Are changes in death rates (in trauma) positively associated with trauma system development?
- o Is designation of trauma centers an effective mechanism for reducing trauma death rates?
- o Are changes in trauma death rates occurring in systems without designated trauma centers?

Answers to these questions are of great importance especially at the levels of DEMS and above. The reduction in death rates is viewed by representatives at these levels as one of the major outcome objectives for the national EMS program. Testing of the plausibility of this objective can be accomplished by proceeding to design and implement trauma impact studies of increasing sophistication.

2. Trauma Impact Studies -- Background

Two types of impact studies are recommended here; a cross-sectional analysis and a longtitudinal/compliance analysis. These suggestions are based partially in imput obtained in the field as well as on four studies conducted previously. Although aspects of each of these four studies have been criticized for methodological approach and limitations of results, it was felt by the majority of respondents that they could be used as models for trauma impact analysis. It was also recognized that these types of studies were replicable (with some modifications) by programs in the field. The four studies are reviewed here to provide the basis for the subsequent discussion of suggested program analysis options.

a. John G. West, MD; Donald D. Trunkey, MD; Robert C. Lim, MD

This study examined two sites: Orange County, which had no trauma center, and San Francisco County which did. The authors' intent was to examine 100 consecutive motor vehicle deaths (trauma induced) in each county. Field deaths, and deaths occurring during transport were excluded from review. Records of patients who had been treated at other hospitals and then referred were also excluded. The study period was 1974 for Orange County and 1974-1975 for San Francisco County, in order that the record sample would total 100 for each.

The three physicians examined death certificates, coroners' reports, autopsy data and, from San Francisco Hospital, patient records. Injury severity scores were calculated for each patient. Each patient death was classified by CNS-related or non-CNS-related cause. The authors then classified each death as being preventable, potentially preventable, or non-preventable.

West, Trunkey and Lim focused on four key factors: patient age, time intervals, surgical procedures performed and cause of death. In a separate paper, West addresses these factors as indicators that an effective trauma system may not be in place when:

- o More than 50 percent of deaths occur in patients less than 50 years old;
- o More than 50 percent of deaths occur in an interval of less than 6 hours from time of arrival to the time to the emergency room;
- o A small percentage of patients receive surgical intervention; and
- o A large percentage of deaths occur from hemorrhage.

This study determined that the county with a trauma center, quick resuscitation and transport of the patient to an appropriate (trauma) hospital, had better outcomes than the county that did not.

b. D. R. Boyd, MDCM; K. D. Mains; B. A. Flashner

Studies of the Illinois Trauma Program, Region III-A, were longitudinal. All motor vehicle deaths (290) were examined. Sources reviewed included hospital and emergency records, autopsy and county coroner reports, Illinois Highway Department records and the State Police Department of Vital Records. All deaths occurred during 1971 or during the first six months of 1972. Four trauma centers were designated between July and December, 1971.

This study looked at grosser indicators of impact such as the highway mortality, time of death and patient redistribution. It was noted that the number of patients getting to the trauma center increased; the number of patients dying in the hospital as opposed to dying in the field increased. During the same period, there was a decrease in highway deaths for Region III-A and an increase of accidents and injured. A follow-up study was done using basically the same methodology and with similar results.

c. Orange County Emergency Medical System (OCEMS), Orange County Medical Association, Surgical Society and Society of Neurosurgeons

Unlike the West, Trunkey and Lim study where one of the counties had a trauma system in place, and unlike Boyd's study where four trauma systems had just been designated, this study examines the Orange County system which had not yet designated its trauma centers. The study was used to show the Board of Supervisors that Orange County would benefit through an improvement of the trauma care system, of which categorization and designation of hospitals were to be a part.

A four person physician team examined 100 randomized motor vehicle deaths. Field deaths, deaths occurring during transport, patients transferred from facilities outside the county and deaths determined to be non-trauma induced were excluded from review. The study period was July 1977-June 1978.

The team examined coroners' and autopsy reports, death certificates, hospital records and paramedic reports. Deaths were classified by potentially salvageable versus non-salvageable CNS related or non-CNS related in the context of a proposed optimum trauma system. The study noted "system errors" on which a trauma system, in place, might have impact. The system errors include:

CNS & Non-CNS -- Delay or no blood given,
-- Delay, or lack of consultant,
-- Delay of patient to operating room,
-- Medical procedures not available,
-- Delay or no Central Venous Pressure taken.

The findings indicate that two of 43 CNS patients and 18 of 21 Non-CNS patients were potentially salvageable. Although this study does not directly deal with impact since a trauma system was not in place, Orange County has established their baseline data to compare to a later period when a trauma system will be up.

d. Mullner and Goldberg

This longitudinal study in Region V in Illinois examined samples of motor vehicle injuries and deaths at trauma centers and at hospitals not designated as trauma centers. Computer tapes compiled from traffic accident reports were used. The study period included 1970-1971, pre-trauma system implementation, and 1972-1973, during trauma system initiation. Case fatality rates were compared. The findings indicated a decline in the mortality rate at trauma centers, while hospitals not designated as trauma centers showed no change.

3. Cross Sectional Analysis Option -- Description

a. Discussion

Based on our observations of the EMS program and discussions with those involved with the program, we are recommending a cross sectional analysis as one of two impact evaluation options. We have specifically been looking for an evaluation option that would examine the overall program goal of reducing death and disability and contain the following desirable characteristics:

- o Replicability -- Obviously the desiqn must he replicable by a number of systems, not only those that are mature and sophisticated;
- o EMS Staff and Clinician Involvement -- Clinicians and EMS staff who would be willing to commit themselves and their systems to this evaluation effort are crucial;
- o Economics -- This evaluation should be planned and implemented at a reasonable cost with quick turn-around time.

The West, Trunkey and Lim study seems to be a plausible model on which to base the following analysis option.

We recommend that a trauma impact study be implemented in 20 EMS regions, 10 that have designated trauma centers (operational for at least 6 months), and 10 that have not designated trauma centers. All injuries and deaths resulting from motor vehicle accidents during a one year period will be examined. The target sample is 100 study cases in each region over a one-year period.

This evaluation will require access to ambulance run sheets, medical records, autopsy and coroners' reports and death certificates. The assistance of the Motor Vehicle Administration in each region will be necessary for the provision of a listing of motor vehicle accident victims within the specific time frame. Hospital and ambulance cost and billing data will also be required.

The West, Trunkey, and Lim model and other applicable study models can provide suggested indicators for the analysis of this effort. Information such as patient demographics, time intervals, laboratory and surgical procedures performed and the cause of death should be abstracted from the records and compared across sites. In addition, there have been several methods developed to score and compare injuries of patients. One objective should be a literature search to analyze the severity ratings methods that already exist and to select one to be utilized in the study.

The establishment of criteria to select participants is important. We suggest that 15 regions that have designated trauma centers and 15 regions that have not, be selected through review of the grants and abstracts, and through discussions with individuals involved with EMS. Site visits should be conducted to each of the 30 regions to discuss, with key staff, the scope of the study, the preliminary design and requirements for participation. In this way, the interest and support of the local clinicians, the availability and access to records, time and staff capabilities could be assessed prior to the implementation of the study. This assessment should result in the selection of 10 regions that have designated trauma systems and 10 regions that have not, as the study participants.

(1) Scope of Work

The study design should be developed to test four null hypothesis:

- o The rates of trauma deaths will remain uninfluenced by trauma system development implementation;
- o Victims of motor vehicle accidents are being transported to designated trauma centers as rapidly and appropriately as to non-designated trauma centers.
- o Victims of motor vehicle accidents are receiving appropriate care in both designated and non-designated trauma centers.

- o The cost of treating victims of motor vehicle accidents are the same in a designated trauma center as in a non-designated trauma center.

The scope of work should include four tasks, discuss:? in the following sections.

(a) Literature and Document Review

All articles, documentation and studies pertaining to EMS should be reviewed, with special concentration on research and evaluation approaches, methodologies and results. The documents/articles should be classified by type (i.e., program description, legislation, research and evaluation, etc.). The literature review should result in a written analysis of findings with emphasis on information salient to the study design.

(b) Preliminary Study Design

The preliminary study design should address:

- 0 Site Visits -- An initial round of 30 visits should be made to include 15 designated and functioning trauma systems and 15 non-designated trauma systems. The intent of the visits is to select 10 designated systems and 10 non-designated systems for participation in the study. Through the site visits, the evaluation team will be able to ascertain those systems that meet the criteria for study participation.

- 0 Sample Selection -- The targeted sample is 100 motor vehicle accident victims per region within a specified time frame, one year. The preliminary study design should include a plan to access the required records.

- o Data Acquisition -- Data abstract forms should be designed and implemented by the evaluator and should include:
  - Facility profiles,
  - Interview guides,
  - Data collection forms for pre-hospital, medical records, coroners' and autopsy report and death certificate information,
  - Data collection forms for cost and billing information.
- o Severity Index -- A type of severity index should be selected from existing models and used for this study to calculate severity ratings for each patient.
- o Analysis Plans -- Analysis plans should address the hypotheses formulated to be tested.
- o Collaboration -- Success of the study is partially predicated on a collaborative framework. The study design should address the roles and interaction of the three groups involved: the evaluator, consultants and participating EMS regions.

(c) Analysis

The analysis should present the rationale for the study, methodology employed and results of the data abstraction. Particular emphasis should be placed on indicators of appropriate care and the relative costs involved of emergency treatment in a designated trauma center versus a non-designated trauma center and between different EMS regions.

(d) Study Implementation

The cross sectional design option as presented could be completed in 18 months at an estimated cost of $500,000. A tentative schedule of timing and approximate costs follows:

	Months	Dollars
Site Visits (30)	3	$ 60,000
Literature Review and Study Design	3	50,000
Study Plan/Implementation	6	250,000 60,000
Data Collection		
Analysis	3	80,000
TOTAL	18	$500,000

4. Longitudinal/Compliance Analysis -- Description

a. Rationale for Selection

This type of analysis involves tracking patients with specified injuries through the EMS system, reviewing whether the more severely injured are being treated at higher level facilities (a sub-analysis would evaluate appropriateness of treatment) and examining outcomes (lived or died, lengths of stay, costs). Compliance is moving patients to facilities most appropriate for the treatment and management of the patients' injuries. The assumption is that the treatment of most severely injured patients rendered in higher-level facilities (trauma centers) will eventually result in the reduction of deaths from trauma. Examining the extent to which patients are getting to the appropriate facilities and whether they are living or dying, (compliance analysis) is perceived as an adequate means of assessing the system's ability to reduce trauma deaths.

b. The Study Design

Thus, the second impact evaluation option recommended is a longitudinal/compliance analysis. This type of study will permit an analysis of the effect of designating trauma centers within EMS regions. The characteristics of replicability, EMS staff and clinician commitment and consistent analytical approach are important to this study design. This type of study has been, and continues to be, the preferred impact analysis of the director and personnel of DEMS.

(1) Literature and Documents Review

Articles, documentation and studies pertaining to EMS system impact analyses should be reviewed. Attention should be given to determining those aspects of different methodological approaches which could be integrated into this effort. Information of injury severity indexes should be analyzed to aid in the selection of an index for use in the evaluation:

(2) Sample Selection

In assessing national program impact, it is necessary to select a sample of EMS systems representing differing levels of development. Systems in the process of or just recently having designated trauma centers, systems with designated trauma centers which have been operational for one to two years and systems with designated trauma centers which have been operational for three years plus, should be included in the sample. Eight systems within each category would be desirable.

Site visits should be conducted to approximately 30-35 regions to discuss the scope of the study, the capacity,interest and support of the local staff and clinicians, availability and access to data. As a result of these preliminary discussion, a study sample of 24 systems can be selected.

The study will involve participation of selected sites for a period of at least two years to establish and assess changes occurring over time.

(3) Null Hypothesis

The null hypothesis to be tested is:

- o The rates of trauma deaths are the same in designated trauma centers as in non-designated facilities.

(4) Study Data Requirements

This evaluation will require access to ambulance run sheets, medical records, autopsy and coroners' reports and death certificates. The assistance of the Motor Vehicle Administration in each region will be necessary for the provision of a listing of motor vehicle accident victims within the specified time frame. Hospital and ambulance cost and billing data will also be required.

Data on injury severity will be needed and an important aspect of each evaluation will be the use of an agreed upon injury severity index. Such an index should be used by personnel and clinicians educated as to the content and meaning of the score index. In addition, information on patient demographics, time intervals, laboratory and surgical procedures and cause of death should be compiled.

(5) Chi-Square Analysis

DEMS has developed a mechanism for the analysis of compliance. Chi-square analysis involves arraying data on trauma centers/non-trauma centers and outcomes (lived/died) in a chi-square matrix. It is expected that with the designation(s) of trauma centers, a number of shifts or changes will occur:

- o Fewer major trauma victims will be treated in non-designated facilities.
- o Deaths from major trauma will drop in non-designated facilities.
- o Increasing number of major trauma patients will be treated in designated trauma centers.
- o Death rates from major trauma will rise in designated trauma centers.

Figure V-1 on the following page illustrates how a Chi-square analysis would show the shifts occurring over time.

The Chi-square format provides a simple, easy to use and understandable indication of data on system function. It is recognized that the analysis of compliance has to proceed beyond the Chi-square analysis to probe in greater detail the characteristics of the patient population handled each year, the appropriatness of care and costs. However, it does suffice as a means of indicating measures of system impact.

Changes in death rates, whether positive or negative, must be evaluated in reference to the type and severity of the injury. An injury severity index or scoring system should be used by all systems in the compliance analysis. The index used should be selected and promulgated by DEMS. As often as possible, the same indexing system should be used by all systems to aid in cross-sectional analyses. It is critical though, that the same index be used by facilities within the system over time.

(6) Study Implementation

The longitudinal/compliance option as presented could be completed in three years at an estimated cost of $750,000. This estimate includes literature review and study design, initial site visits and sample selection, study coordination and management, study data collection and analysis. A tenatative schedule of timing and approximate costs is:

CHI-SQUARE ANALYSIS - COMPLIANCE

Baseline Year 0

	Lived	Died
Designated Trauma Center	0	0
Other Hospital	25	75

Year 1

	Lived	Died
Designated Trauma Center	10	35
Other Hospital	30	25

Year 2

	Lived	Died
Designated Trauma Center	30	45
Other Hospital	20	15

Year 3

	Lived	Died
Designated Trauma Center	55	40
Other Hospital	5	0

FIGURE V-2

	Months	Dollars
Literature Review and Study Design	3	$ 50,000
Initial Site Visits and Sample Selection	3	$ 80,000
Study Coordination	on-going	$ 50,000
Study Data Collection		
Year 1	12	$240,000
Year 2	12	$240,000
Data Analysis	3	$ 90,000
TOTAL	36	$750,000

B. PROGRAM FINANCIAL ANALYSIS

1. Rationale for Selection

As noted earlier, a second major objective for the national EMS program is the provision of seed monies to develop a wall-to-wall network of financially viable EMS systems. Two types of information are needed for an analysis of how successful the seed money strategy has been in enabling eligible entities to develop and implement EMS systems. First, information is needed on the financial viability of the individual EMS systems. Secondly, data is needed on each of the 304 designated regions to indicate how many regions have received funding, the amount of funds granted, and the level of development (1202, 3 etc.) of each region.

In making any judgments about system financial viability, data is needed to answer the following questions:

- What percentage of the annual budget is provided by DEMS? The State? County and local government?
- What percentage of the budget is provided by other agencies?
- What percentage of each annual match is hard? Soft?
- What percentage of administration and staffing expenditures are funded by grant monies? By state, county or local government?

- What are the costs associated with the components of manpower/training, communications, transportation, categorization/designation?

- What are the costs associated with the development and implementation of the critical care plans (especially trauma)?

2. Program Financial Profiles - Description and Discussion

A program financial profile should be developed, maintained and regularly reviewed for all funded EMS systems. This information was perceived to be crucial by representatives at all levels.

The suggested financial profile should organize and array key program financial data on an annual basis. Figures V-3 and V-4 provide samples of the way in which such information could be reported by each grantee. If such a format were used changes over time could be analyzed.

The profiles should show:

- Project funding history; and
- A recent summary of expenditures by major program components.,

Together they provide a trend of expenditures, DEMS and non-DEMS income sources, and a current profile of expenditures by major program components.

One of the critical activities of all developing EMS systems is obtaining support from the state, county and local government. There have been no more specific requirements for such support other than the requirements that a certain percentage "match" be obtained. For the first grant under Sections 1203 and 1204, not more than 50 percent of the eligible costs for an EMS grant will be provided by federal funds. For the second grants under these sections, not more than 25 percent will be provided. Grantees have been able to meet the matching requirements with "hard" matches as well as with "soft" or in-kind matches.

CURRENT OPERATING
EMS BUDGET/EXPENDITURES
BY MAJOR CATEGORIES

PROJECT NAME: _____
ADDRESS: _____
CITY: _____
STATE & ZIP: _____

FOR CURRENT OPERATING YEAR: (1979 - 1980)

CATEGORIES	SOURCES OF PROJECT SUPPORT						
	DEMS Section 12 / A	BHP B	DOT C	STATE D	LOCAL E	OTHER (SPECIFY) F	TOTAL G
ADMINISTRATION							
Personnel							
other							
TOTAL							
COMMUNICATIONS							
Ptrtonntl							
Equipment							
Other							
TOTAL							
CATEGORIZATION							
Personnel							
Contract0							
other							
TOTAL							
TRAINING							
Ptrtonntl							
Contracts							
Other							
TOTAL							
AMBULANCE							
Personnel							
Equipment							
Other							
TOTAL							
AGGREGATE							
Personnel							
Equipment							
Contracts							
Other							
TOTAL							

FIGURE V-3

EMS FUNDING SOURCES
HISTORICAL PROFILE

PROJECT NAME: _____
ADDRESS: _____
CITY: _____
STATE & ZIP: _____

SOURCE	CALENDAR YEAR										
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
DEMS Amount											
Section											
BHP											
DOT OTHER FEDERAL											
TOTAL FEDERAL											
STATE hard											
in-kind											
LOCAL hard											
in-kind											
OTHER (specify)											
TOTAL NON-FEDERAL hard											
in-kind											
GRAND TOTAL hard											
in-kind											

* Key - "Hard" matches = budgeted funds committed on an annual recurring basis in-kind matches = all other resources committed.

FIGURE V-4

The suggested financial profile requires information on the matches provided. It is important to be able to evaluate the ratio of hard to soft matches provided over time. Increasing amounts of cash monies are perceived by most respondents as an adequate indication of the increasing financial viability of the system. Most respondents recognized the value of soft matches but noted that garnering this type of support did not necessarily ensure control over such resources by the EMS system nor were soft matches viewed as a reliable indicator of long range commitment. The profile exhibits hard and in-kind matches obtained; hard-matches being budgeted funds committed on an annual basis, in-kind matches being all other resources committed.

The funding profiles require that another set of data should be collected and reviewed to focus on the percentage of the administration and staffing expenditures funded by various sources. Respondents indicated that sole reliance on, and the continued use of grant funds for administration and staffing was a sign of financial instability. The corrolary was also expressed: Funds provided by the states, county or local governments to cover staffing and administration are a good indication of commitment and thus of continued financial viability.

The funding profiles will assist in the assessment of financial viability by requiring information on the costs associated with the development and implementation of the components (especially manpower/ raining, communications, transportation, categorization/designation) and critical care plans (especially trauma)). For example, if a system is devoting high levels of funds to a particular component or critical care area, there may be cause for some concern especially if the amounts overtime remain proportionately high in comparison to other components or critical care areas. In certain instances it will be necessary to sustain a high initial outlay (ex. implementation of communications system) however, if such high outlays continue it is usually a sign that the activity is not proving cost effective. This will affect financial viability.

The amount of support that DOT and the Bureau of Health Professionals assign local projects needs to be known. While we are aware of the difficulties of coordination with DOT, there is less basis for the apparent lack of PHS coordination. Such coordination can take place both at headquarters and the Regional Office. Sadly, only grantees seem to have the capacity to report sources of funding from different federal agencies. Since this is so, the suggested funding profile can provide HSA/DEMS with indications of where and how much other federal funds are going and what they are being used for. When such a profile is available for all funded regions, then it may be more possible to coordinate within PHS and between PHS and DOT.

C. PROGRAM PERFORMANCE ANALYSIS -- THE ACHIEVEMENT OF OPERATIONAL OBJECTIVES

The achievement of operational objectives (system development and implementation) is perceived as the way in which financial viability and a reduction in death and disability will be brought about. As a result of this perception, program managers and personnel expressed the need for information on program performance. Information, then, about the achievement of structure, process and performance objectives provides insight into the progress being made by the individual EMS systems and the national EMS program as a whole.

Measuring system structure, process and performance is in essence measuring the extent to which "intermediate" operational objectives are being realized. If measures are taken on the degree to which intermediate objectives are being achieved, insight will be gained about the ability of systems to become financially viable and to effect reductions in death and disability. This inference is based on the acceptance of the premise that if systems are progressing, financial viability and reductions in death and disability will result (causal assumptions)

In order to provide needed data on EMS systems, system performance analyses should be undertaken. Such analyses should provide information on system performance to facilitate:

- o The analysis of the extent to which each EMS system is achieving structure, process and performance objectives;
- o The analysis of how EMS systems are functioning relative to prior performance, and;
- o The analysis of how EMS systems are functioning in comparison to the performance of other systems of a similar nature.

Collecting and analyzing data on system performance will be accomplished through the implementation of a management information system designed by DEMS personnel. The REMMIS system (Regional Emergency Medical Management Information System) is described below. The testing and subsequent implementation of this system is recommended.

1. The REMMIS System (Regional Medical Management Information System)

A new management information system has recently been developed by the office of DEMS which requires grantees to self-report data in a structured format. The objectives of the REMMIS are: to develop an evaluation base and thereby improve assessment of'grant performance and EMS program outcome; to reduce the applicant burden by 40 to 50 percent through modification of the application procedure; and, to collect information on self-sufficiency in order to assess the State and local support for continuation of the EMS Regional systems.

In the justification for the REMMIS, the need for such a system is noted; key points of justification include:

- o Volume of Data -- A tremendous amount of data is generated by each of the programs covering the 15 components and 7 critical care areas. Collection, storage, retrieval and analyses of this data can no longer be efficiently handled by a manual system.
- o Data Availability -- A chronic problem facing developing EMS systems has been the lack of access to other data systems. And when access was obtained, lack of consistency, reliability and validity often mitigated against extensive dependence on such data. The need for a system to collect and report information comparable from one locality to the next is of great importance.

- o Data Consistency -- Historically, there has been great diversity in definitions, data collection, reporting, and analysis. A standardized system is now needed to ensure reporting of comparable data on a timely basis.

- o Program Evaluation and Feedback -- Little or no feedback has been provided to the regions. Data supplied to date has never allowed for the correlation of information among EMS regions. Evaluation of the medical impact of the programs and subsequent feedback to the EMS regions is clearly needed.

- o Grant Applicant Burden -- Tremendous amounts of resources are depleted by the annual grant application process. A mechanism to reduce applicant burden will allow for the more efficient and productive use of available resources. The standard reporting format and the reporting of certain information on a one-time basis would alleviate some of the burden sustained annually.

The agreed upon measures of system structure, process and performance will be taken by the proposed REMMIS. (These measures were discussed earlier in Chapter IV.) Information on the financial status of each program will also be collected. It is suggested that the testing and implementation of the REMMIS proceed. The uses of data, reported in a consistent and timely fashion are numerous. DEMS will be better able to assess program performance; feedback to Congress, the States, Regional Offices and individual programs can be provided; regional offices and state lead agencies can use such information in the grant monitoring activities. In sum, the use of REMMIS will significantly aid the management of the national EMS program and will provide an effective mechanism for the provision of feedback. During the early stages, the REMMIS data will provide an effective means for the monitoring of systems' progress and the identification of those systems where problems or obstacles are being encountered. With increasing familiarity and sophistication in the use of REMMIS, the quality and reliability of data should improve, making the information provided more useful for program evaluation.

D. MANAGEMENT OPTIONS

The suggested management options have been developed based upon extensive review of documentation on the EMS program as well as upon the opinions and suggestions expressed during site-visits and interviews.

1. Development of a Funding Strategy

It is suggested that a funding strategy for the national EMS program be developed to provide an improved justification and basis for the allocation of funds. Such a funding strategy should address the program priorities which would obtain under varying levels of funding and under varying assumptions about the life of the program. Thus, for example, a strategy should be developed to direct fund allocations which would result if the program were funded annually at $50 million (ideal), $30 million and $20 million. The strategy should also take into account the allocations which would result at these dollar levels if the program were to be continued for two years, three years, and four years.

Questions to be addressed when developing a funding strategy should include the following:

- Should any new programs be started?
- Should existing 1203 programs be funded through two additional years to the 1204 level?
- Should more funds be used for the provision of technical assistance to existing program?
- Should funds be concentrated in developing a smaller set of regions or spread among a larger set of regions?
- Should stiffer pre-conditions for funding be developed? At the 1202 level? At the 1203? At the 1204? (For example, no award will be made until funding commitments are legislated by the state.)
- Should the use of funds be more tightly controlled?
- Is the goal of wall-to-wall systems possible to attain within two years? Five years? Ten years?
- Should "slow" programs be funded additional years if they are making progress, but need more time?

To date, it appears that no funding strategy has been developed. This has resulted in DEMS being placed in a reactive position in its relationship with Congress and the Administration as well. The development of a comprehensive funding strategy, one which considers differing levels of appropriations and different assumptions about the life of the program, will improve the quality of all discussions about the program. It has appeared that discussions about the national EMS program have been primarily political in nature; a funding strategy could help to augment any case, to be made for the program. Both Congress and the Administration can use better information upon which to base decisions; a funding strategy which indicates impact on programs at several funding levels and which outlines the rationale for fund allocations will help to inform and improve relations between DEMS, Congress, the Administration, the States and EMS systems.

It is clear that the regions which remain unfunded in 1980 are much different than those which were unfunded in 1976. The consensus of opinion is that these regions are going to be the most difficult to develop. These regions will no doubt require significant funding and technical assistance. It is understandable that questions will be asked about the ability of these regions to develop and maintain effective EMS systems. If achieving financial self-sufficiency has been so difficult for regions with effective management and service delivery, how will regions with a paucity of resources and limited initiative succeed? A decision has to be reached about funding regions such as these. Judgement as to the cost benefits and further financial viability must now be exercised in order to most effectively allocate the available EMS funds.

2. Targeted Technical Assistance

Three areas for targeted technical assistance merit additional attention: communications; model legislation; and, program reporting.

a. Communications

EMS systems in the early stages of development need additional technical assistance in the design and implementation of a communications network. Such assistance should focus on: legislation and regulation; system design, maintenance and control; system cost accounting.

More information about the Federal rules and regulations needs to be provided to the EMS regions. Three agencies -- DEMS, DOT, and the FCC -- have developed communication system requirements. A technical assistance document which organizes and summarizes the varying requirements should be developed and promulgated. Currently, no central comprehensive source of information exists and it is felt that such a source document would be of help to developing EMS regions.

Another type of information is needed; models of system design which specify essential equipment components can now be developed. These models can be based upon the experience of the program which has occurred to date. Models should be developed which are applicable to different geographic areas and population densities.

It is recognized that,to date, the EMS systems were given a great deal of latitude in developing their communications systems. This was to allow for the unique aspects of each region in terms of topography, population density, funding base and systems already in place. However, enough regions have designed and implemented systems that some greater degree of specifity can be provided to newer systems. This is especially true as it relates to equipment and system design. It is fairly clear that certain technologies are more appropriate than others and more effective in providing for medical control.

Questions frequently arise about the costs of implementing and maintaining different components of the communications systems. A methodology for estimating costs of implementation and maintenance would assist program directors in more effectively managing the finances

of the system. Based upon past costs associated with implementing communication systems of varying configurations, some projections can now be made. Although these estimates will not be exact, the forecasting of costs will provide some indication of the funds which the region will need if the communication plan is to be implemented.

b. Model Legislation

Critical to the development and survival of any EMS system is enabling legislation obtained at the state level. Because most EMS regions cross the lines of established political units, coordination and control is extremely difficult. Generating sufficient financial support is also problemmatic. Certain states have passed legislation which ensures continued state financial support and which clarifies the roles and responsibilities of the providers of emergency medical care. Such legislation should be carefully analyzed and models based on this legislation should be designed and provided to all of the EMS regions.

Model legislation should be developed in the following areas:

- 911/Communications -- DOT has developed model state legislation for the implementation of 911. Based on laws in six states which have mandated the implementation of 911, this model legislation represents the type of effort being proposed here. Additional model legislation should be written to cover the other aspects of communications systems required for emergency medical service delivery. Included in the model legislation should be general specifications in the following areas:
  - use of assigned frequencies;
  - state communications organization, coordination and control;
  - public safety agencies interface;
  - licensing/standards for private sector communications;
  - monitoring and record-keeping.
- State Functions and Responsibilities -- Model legislation which describes the state functions and responsibilities in coordinating and providing emergency medical services should address the following:

- Licensure of all EMS vehicles;
- Specifications and standards for all vehicles and equipment;
- Standardization of training for all ancillary EMS personnel;
- Certification, re-certification and de-certification of all ancillary EMS personnel;
- Coordination between Health Systems Agencies (HSA's) and EMS regions;
- Categorization and designation of emergency medical facilities;
- Delineation of jurisdictional boundaries;
- State assurances of continued adequate levels of financial support.
- State responsibility for care of indigents.

o Provider Functions and Responsibilities -- A great variety of personnel are involved in providing emergency medical services. The roles and responsibilities of many of these types of personnel need to be defined and regulated. Model legislation should provide examples of how the following points can be covered through legislative or regulatory processes:

- Allowable services to be provided by public safety personnel;
- Allowable services to be provided by other ancillary EMS personnel;
- Designation of a regulating body for ancillary EMS personnel;
- Regulation (standardized) for all transport entities to define accountability and provide for control;
- Malpractice coverage for all EMS personnel;
- Responsibility of designated units/centers for provision of care, training, reporting of data;
- Sanctions for non-compliance;
- Grievance mechanisms.

These basic functions must reside with the states and need to be authorized by legislative mandate. Centralized regulation of these aspects of EMS system operations will ensure that omissions or conflicts in the areas enumerated above can be eliminated. Effective state-wide coordination is imperative if regionalization of service delivery is to occur.

As noted earlier, since the individual EMS regions cut across political boundaries, the responsibility for duning support is difficult to delineate. An appropriate state role is the development and administration of the funding base for emergency medical services. It is crucial that this support be legislated if the survival of the EMS regions is to be assured. In addition, the role of the state in providing a mechanism for the payment for care of indigents has to be clarified. The costs of catastrophic illness are very high and as such, many providers are reluctant to fully participate in a system which provides emergency medical care to indigents. Assurances of state support must be obtained through legislation if comprehensive participation by providers is to be forthcoming.

C. Program Record-Keeping and Reporting

Technical assistance should be made available to the state lead agencies and the EMS regions to assist them in developing, maintaining and reporting program data in a consistent fashion. The data points which need to be covered by any record-keeping system have been identified in a variety of program documents. However, the lack of standard definitions, the lack of comparable data, varying data collection methodologies and reporting requirements have mitigated against extensive reliance on data obtained.

On-site technical assistance should be given to the personnel directly responsible for data collection, analysis, storage and reporting. Such assistance should specify standard definitions and should aid in the development of strategies for data collection and access to other data systems.

3. Interagency Coordination

The Interagency Committee on EMS has effected only a limited amount of cooperation and coordination between those Federal agencies with some type of EMS component. Efforts should be made to improve this coordination and cooperation between all the agencies with an EMS component. It is suggested that even greater attention be focused on developing improved working relationships between DEMS, NCHSR and BHP and between DEMS and DOT. Attempts should be directed at:

- o Eliminating or reducing conflicting and/or duplicative regulations and requirements.
- o Standardizing and consolidating program guidelines.
- o Developing a funding source identification and monitoring instrument.
- o Developing a consistent, multi-disciplinary research strategy.
- o Developing a coordinated technical assistance effort.
- o Centralizing program information in technical assistance source documents.

Better communication, coordination and cooperation at the Federal level will help to improve the performance of those in the regional offices, State lead agencies and EMS regions. Thus, the need for such interagency coordination is clear. However, the means to implement such coordination -- the Interagency Committee on EMS -- has proven to be unwieldy and frustrating. A large number of representatives sit on IACEMS, many from agencies only peripherally involved in EMS activities. It is suggested that a streamlining of IACEMS activities be undertaken. A core group of representatives from DEMS, NCHSR, BHP and DOT should be formed to meet with greater frequency and regularity to tackle the day-to-day issues confronting effective interagency coordination. This working group should direct attention to the points enumerated above in attempting to eliminate waste and duplication of effort and to improve system design and performance.

In sum, a concerted effort should be made to achieve the goals delegated to the IACEMS. Reducing the size of the working committee which in turn should report back to the committee as a whole, should aid in this effort. An additional consideration remains though. Discussion within the IACEMS should be initiated toanalyzewhether or not the use of such a committee can really effect improved relations between the agencies. If it is felt that this is an implausible means of achieving coordination and cooperation, recommendations should be developed for presentation to the Administration and Congress. Such recommendations should be based on a consideration of the following:

- Would adjustments in IACEMS structure allow accomplishment of the stated IACEMS mission?
- Is the mission plausible for a committee or should some other mechanism be developed?
- Will the commitment to interagency coordination really strengthen and improve?
- Should the IACEMS be discontinued?

VI. DISCUSSION AND PERSPECTIVES

The preceding list of concerns has been gathered from our very limited exposure to the EMS programs. The issues are reported here because they were repeated consistently, and because they have enough intrinsic merit to warrant additional attention. We understand fully that key program officials are aware of most, if not all, of the issues and, in many cases, program actions are underway to address these. In some cases, the EMS program managers have few options since solutions can only come from higher level action. Many of the concerns expressed are typical of many Federal programs; state-Federal relationships often are charged with frustrations. Reviewed below are some perspectives on the EMS program related to the preceding list of issues and concerns.

A. PROGRAM LEADERSHIP

If local projects are comfortable with Federal leadership, then program documents are viewed as guidance; if projects are not comfortable with the leadership, then they are viewed as directives. If projects like the leader, he is charismatic; if they do not, then he is accused of running a one-man show.

In fact, the national EMS program has one recognized conceptual leader, the Director of DEMS, and only one other senior professional able to speak for the program, the Deputy Director. These two have been supported by a modest staff at headquarters, and by only one (or, at the most two) administrative staff persons in each of the regional offices.

Few of our respondents disagreed with the substance of the program concepts, and many gave enthusiastic endorsement to the adhanced conceptual, structural, and procedural framework for the local programs.

B. PROGRAM STAFFING

Given the limited program staffing, the uncertainty of funding, and lack of state funding, the program has used the limited resources in truly creative ways. This has resulted in the director being on the road much of the time providing guidance and support to some programs and, importantly, learning about useful experiences that other programs were having.

To support the administrative staff in the Regional offices, experienced national and local specialists were identified. These consultants have assisted the Regional Office staff in reviewing grant applications, and have provided useful technical assistance to grantees. In this way, the scarce national expertise has been spread among many programs, and new expertise has been and is being created in the process.

C. GRANTS MANAGEMENT

Concerns about who has the authority to approve grants are moot. The Regional Director signs all grants. The headquarter's staff may review and comment on all grants, but as a practical matter they cannot completely examine 150 grants per year and thus the RO review and decisions on grants are generally unchanged by headquarters. Where headquarters has insights into particular grants, these views are shared with the RO and modifications to the grant are appropriately made.

The DEMS staff has had little control over the budget processes. The program was funded by Congress over White House objections, and is perennially a candidate for termination. The effect of these administration actions on local program morale and staff levels is unfortunate; it often means that as key staff go on to other jobs momentum is lost and, in some cases, the program may actually cease to function. Short of giving up, DEMS program leadership cannot easily change these circumstances.

D. PROGRAM GUIDANCE

National and regional conferences have been conditionally programmed by the director to provide guidance to developing programs, to permit formal and informal sharing of project experiences, and to focus on current and emerging program issues. In the early phases of program development, these conferences probably promised more than they delivered. They often dealt with sophisticated program concepts, but the knowledge and documented experiences that may have been useful existed in only a few places and these experiences were not necessarily applicable to all systems. The current workshops and conferences permit a more useful sharing of experiences, but participation by project staff at different levels of experience is often frustrating; beginning programs often can't understand the complexity of the systems' concepts discussed, and advanced programs now have enough experience to be able to modify, and debate singular sounding program guidance. Thus, while these are understandable frustrations connected with these meetings, the overall judgments of most respondents indicate that they have been useful and important to their understanding of program goals, objectives, and experiences.

E. DOT-PHS COORDINATION

Coordination between DOT and PHS has been minimal. There is a legislated mandate for this, and an interagency group has been meeting only occasionally since the program's inception. It is difficult to point to substantive actions taken by the interagency committee that have lead to any improvement in program operations and management. It has apparently been a frustrating exposure for all parties and unless this forum can help focus on program actions, cooperative relations, both at headquarters and in the field, there seems little usefulness in continuing the agency. There is the opportunity to develop supportive program funding priorities; there is the chance to come to grips with the substantive issues of communications systems and technology and to develop a unified and consistent Federal approach. There is theforumto come to supportive agreements on training programs. Unless a major commitment is made by the involved agencies, these opportunities will be lost.

Given the energy needed to develop these supportive relationships, and to translate these programmatically into priorities, policy guidance and program documents, it is understandable that the limited staff in both agencies has concentrated on their own programs, rather than on interagency program coordination. Unfortunately, there are not enough models in other programs and agencies from which to pattern this intra-agency coordination. The fact that such cooperation has not occurred is no surprise. Sadly, had the cooperation worked it would have been the surprise.

F. SEED MONEY STRATEGY

One of the key program administrative strategies confirmed by our interviews was the "seed money" strategy. This assumed that the Federal responsibility in improving EMS systems nationally was in providing the 304 EMS regions with five funding opportunities. This would allow programs to demonstrate to local funding authorities that the EMS system was a necessary adjunct to improving patient care. At the end of these five funding awards the local project would have an advanced life support system, and the Federal funding responsibility would yield in favor of local support. Federal seed strategy is not unique to the EMS programs and the results of such a strategy were predictable.

Programs in wealthy states and communities would be more likely to remain financially viable; programs in poorer, and often in medically underserved areas, would be less likely to remain financially viable. The medically rich states will also be more likely to show program progress, while the medically poorer states will have a more difficult time. In a sense, the seed money strategy assures that the "have" jurisdictions get more, and the "have nots" will get less. While these may be some benefit to the poorer regions in that they will have more hardware, ambulances and communications systems, and some improved levels of staff training, they will be less likely to choose to sustain a more sophisticated system involving a centralized regional agency to administer, coordinate, monitor, and develop these systems.

In discussions with program and policy officials above the DEMS program, we perceived no sensitivity or interest in such issues, rather an endorsement of "seed money" concept, or at least a resignation to this as an appropriate role for the Federal government was evident. In some cases, however, such officials really did not seem to understand the need in many areas; they had not seen evidence that the programs could reduce death and morbidity, or that X number of areas would not have even minimally viable programs. It appeared to the project staff that such data could go a long way toward providing a basis for enhanced discussions at the policy levels about program needs, status, costs, and benefits. Short of such data, and the change in policy officials' understanding of the program, it is likely that the programs will continue as a congressionally supported program, with little support within the administration.

G. STATE LEGISLATIVE AUTHORITY

A consistent pattern seems to emerge in states where there is little legislative basis for the Regional EMS systems. Such lack of authority often puts the newly funded EMS programs in a disadvantaged position regarding such key component activities as training and utilizing EMT's and paramedics, in developing an integrated approach to patient transportation systems, and in securing cooperation from hospitals in designating clinical care units. While we recognize that in the early program years it was useful to maintain maximum flexibility and learn from the variety of program experiences, it now appears useful to catalogue these experiences, and develop more standardized approaches to program development. Each newly funded region should not have to rediscover the wheel.

If the new program priorities place emphasis on regions that have not received support, or are only in preliminary operational modes, then it may be appropriate to develop several acceptable versions of legislative models to assist local programs. If the seed money strategy is still to be emphasized, then such model legislation could be required

at the end of the 1202 grant as evidence that the program has state or local government support. This model legislative package could also contain funding commitment of "hard" dollars as further illustration of commitments.

H. PROGRAM ANALYSIS AND EVALUATION

Even in the best of circumstances, program evaluations have rarely contributed much to major management and policy decisions, yet program evaluation continues to play a prominent role in the lexicon of Federal program difficulties. More than most public program components, program evaluation has seemed to have a life cycle separate from the main stream of program development. The EMS program is not much different.

Commitments for program evaluation for the EMS program were made at the same time as commitments were made for the programs themselves. Some evaluations were even started. This complex program was as willing as any to give program evaluation a chance. The methodology for evaluating this program, however, was virtually non-existant. Early attempts at program evaluations were frustrating and highlighted the need for evaluation methods development.

Such developments came about in four streams of endeavors. DEMS program directors and NCHSR co-sponsored EMS evaluations meetings to try to stimulate single site evaluations, to discuss methods, and to share research methods. DEMS produced an evaluation guidebook that suggest ways projects could assess their activities. NCHSR sponsored research studies geared to developing methods for assessing the impact of program components on death and disability. OPEL/HSA sponsored a series of shorter term studies geared toward data collection and data validity issues.

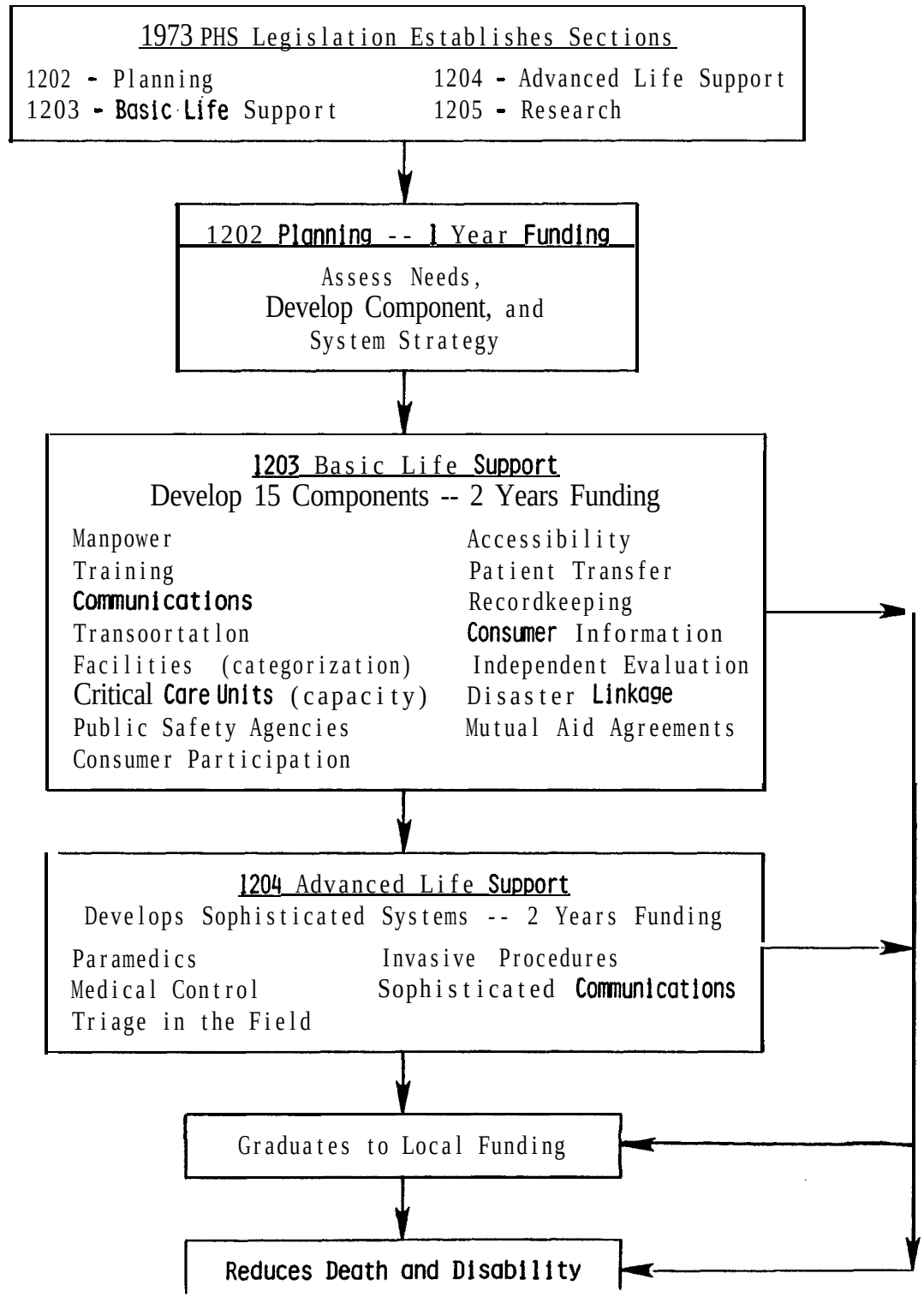
Currently, DEMS is implementing a revised reporting system (REMMIS) that will collect uniform data from each funded project. The data will be used for program administration, program analysis, and program

evaluation. Our cursory review of the package indicates that it would probably do well for two out of three of these objectives--program monitoring and program analysis. This will require intensive training and monitoring to help assure that reporting programs understand the data elements and have the capacity to report data reliably.

APPENDIX A

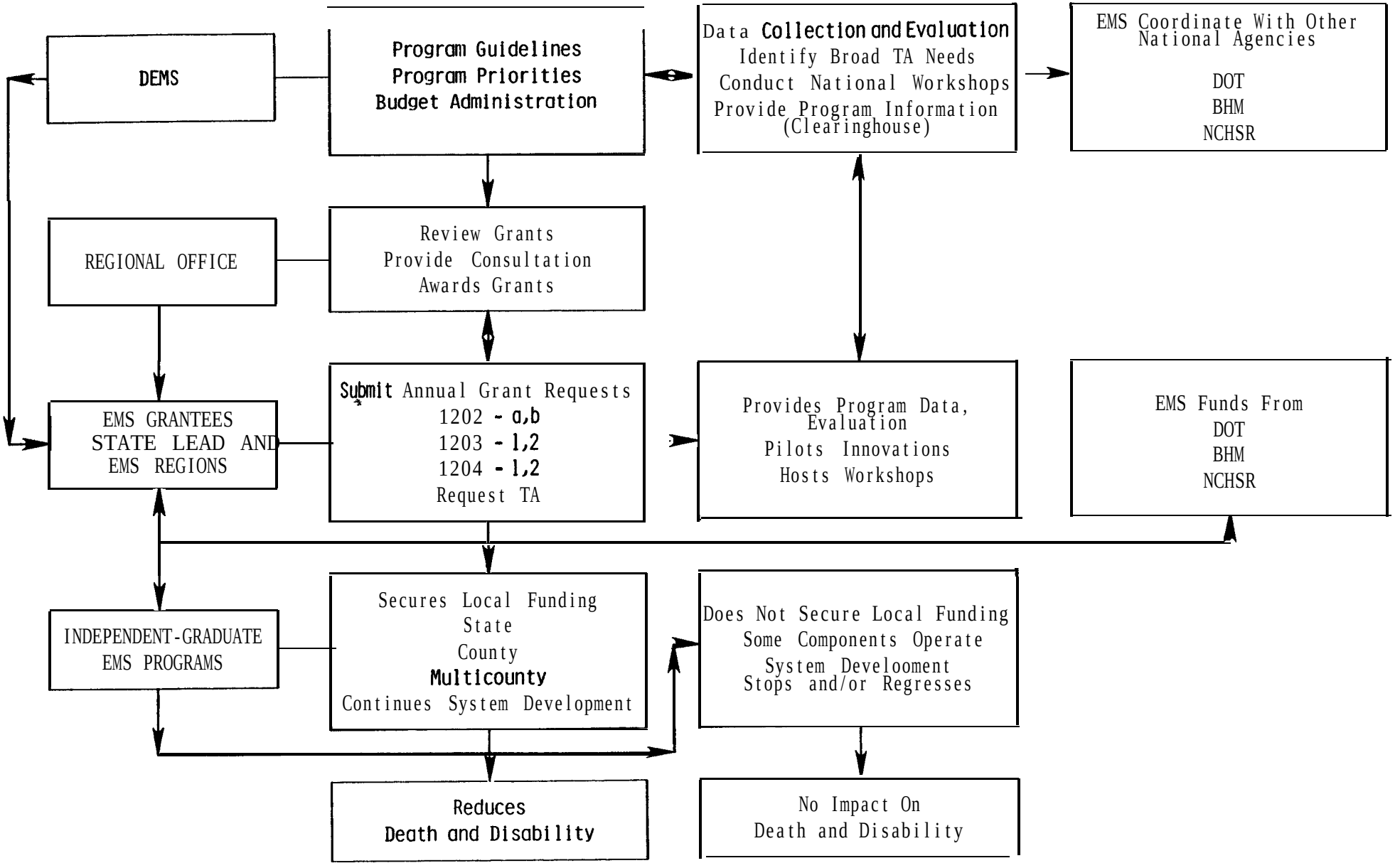
'PRELIMINARY MODELS

EMS BUDGET AND LEGISLATIVE -- LOGIC MODEL



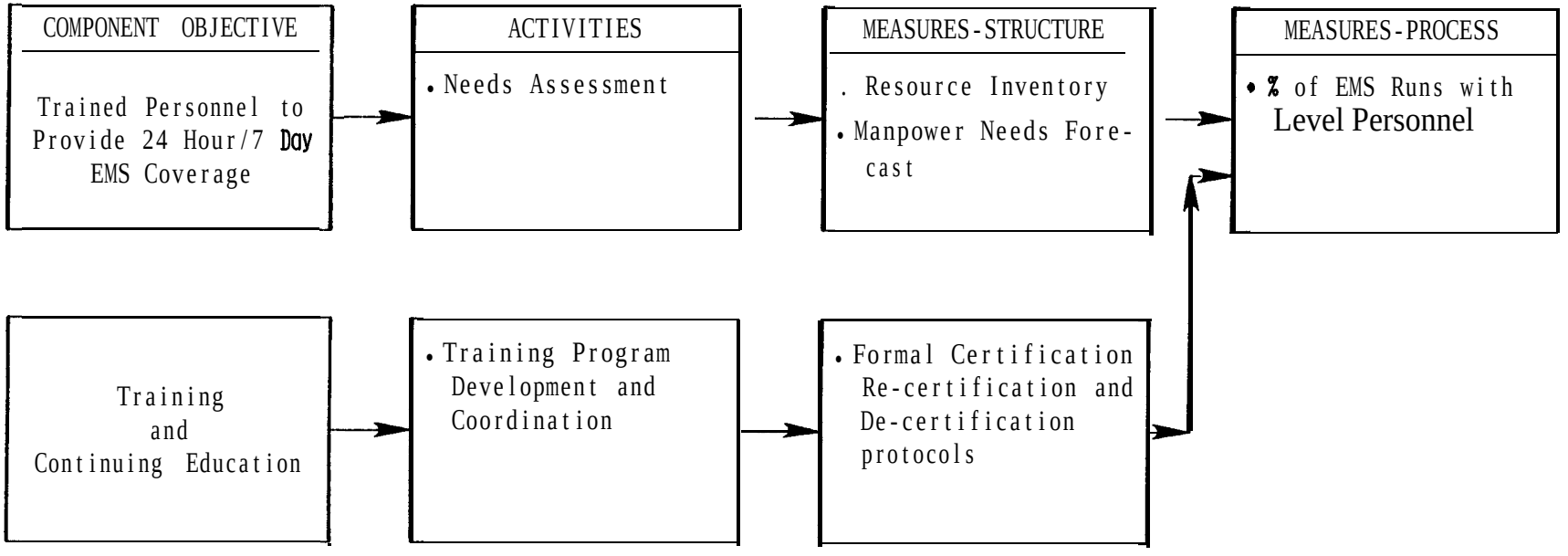
EMS PROGRAM MANAGEMENT

FUNCTIONAL MODEL



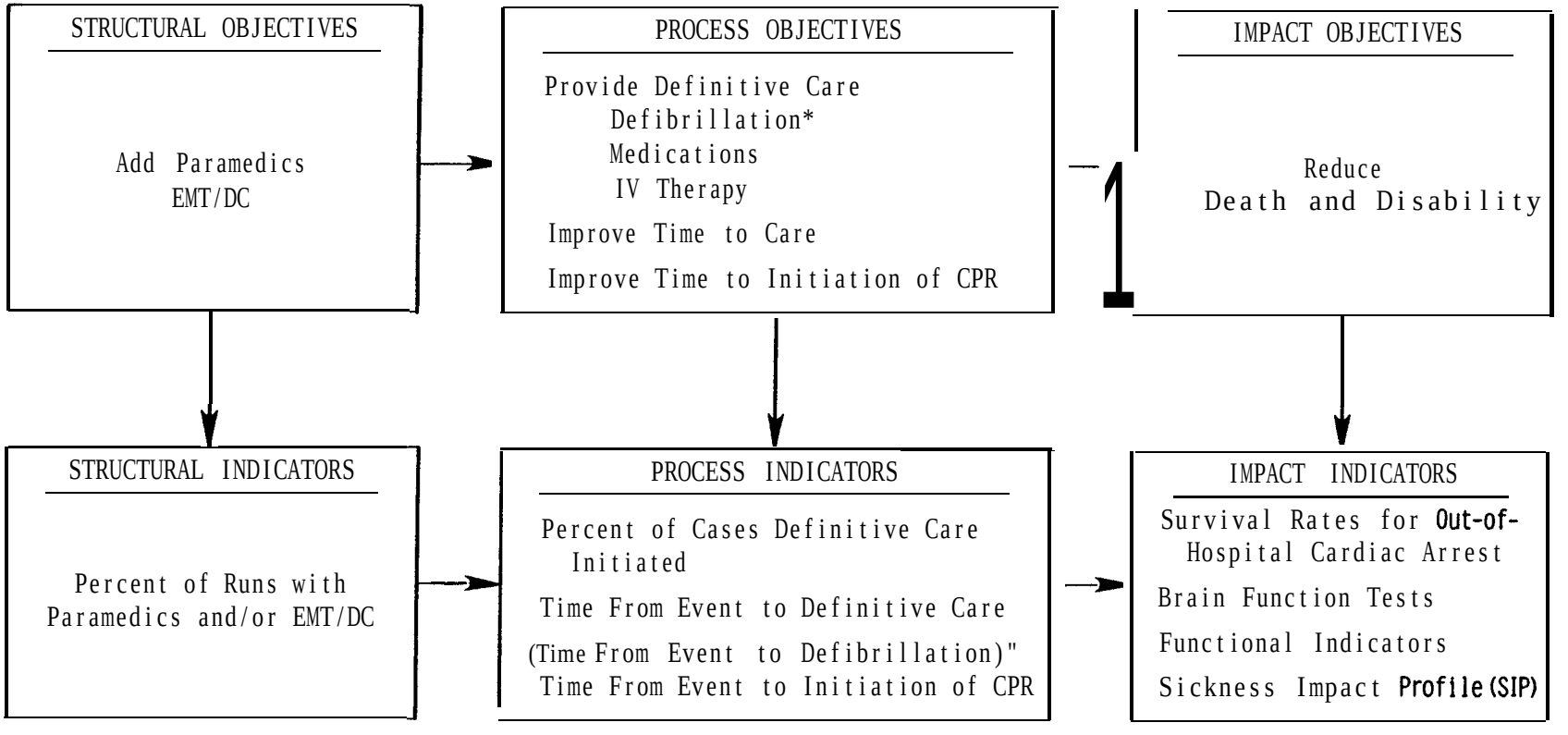
MEASUREMENT MODEL

COMPONENT: MANPOWER AND TRAINING



MANPOWER AND TRAINING

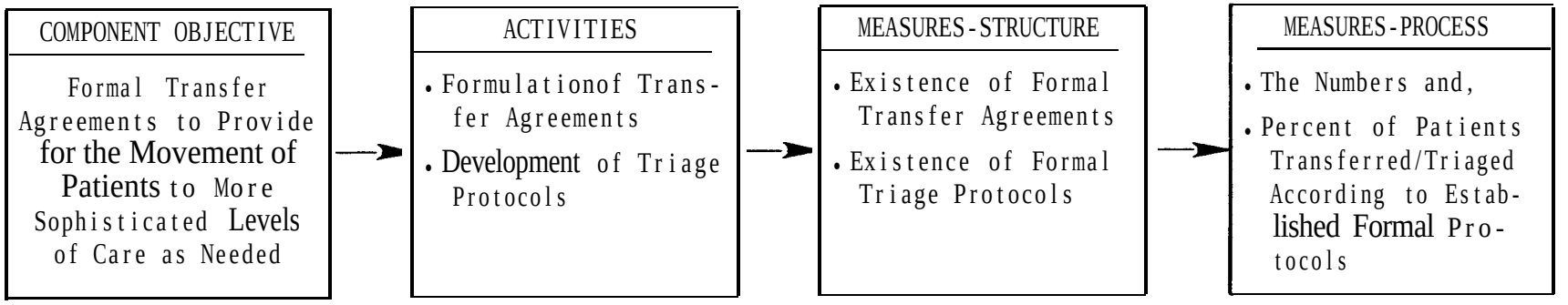
IMPACT MODEL



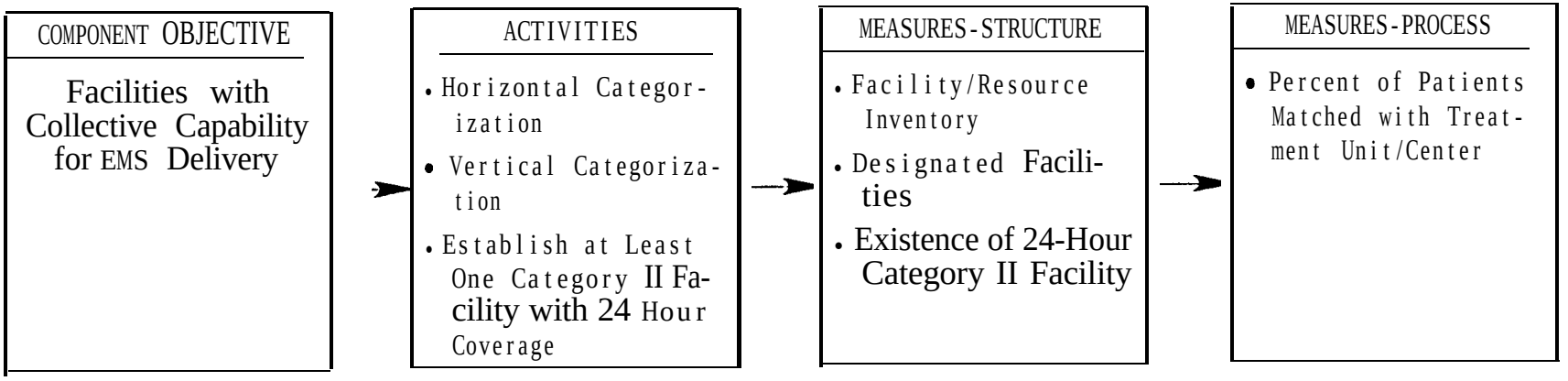
*EMT/DC

Bergner, Seattle-King County Department of Public Health

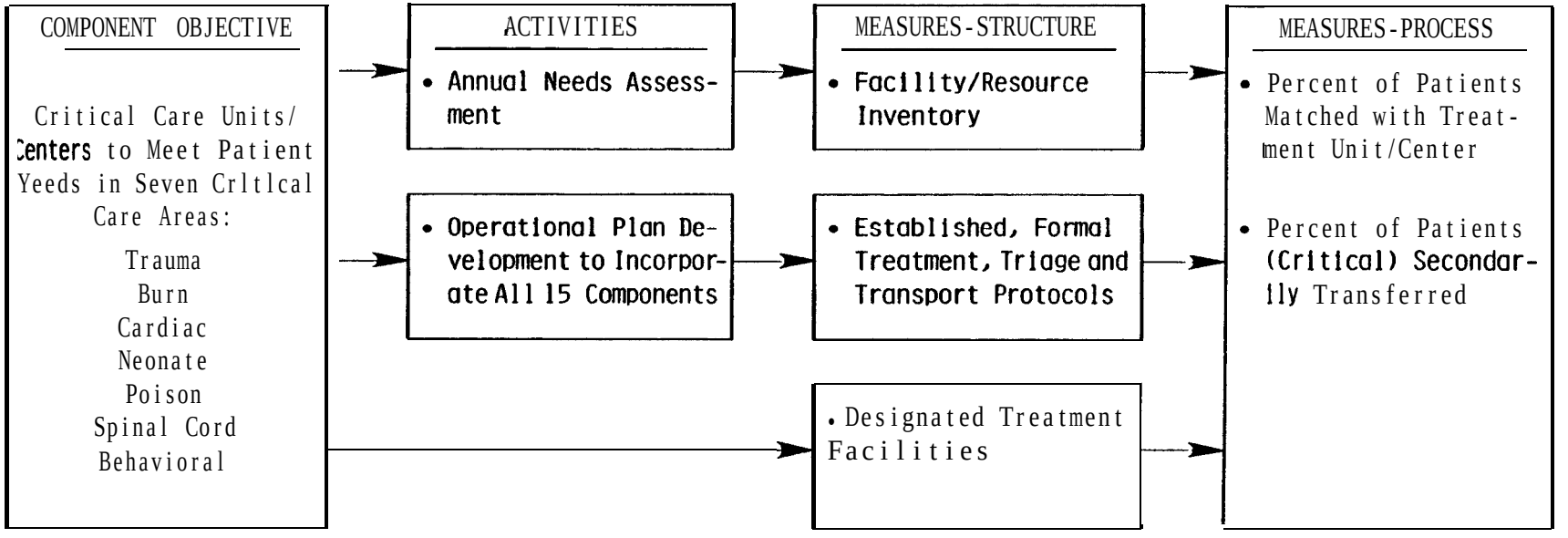
COMPONENT: TRANSFER AGREEMENTS



COMPONENT: FACILITIES

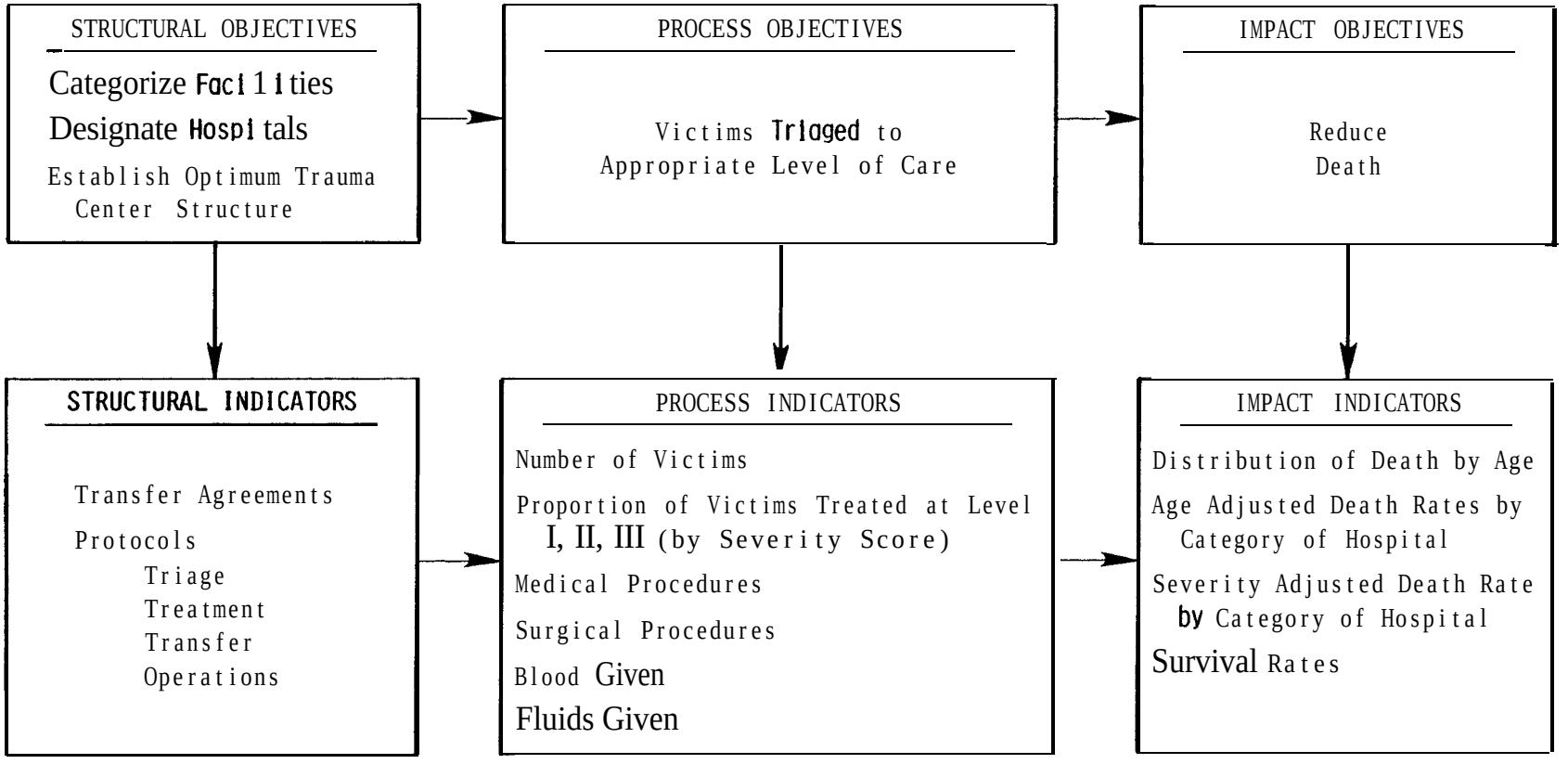


COMPONENT: CRITICAL CARE UNITS



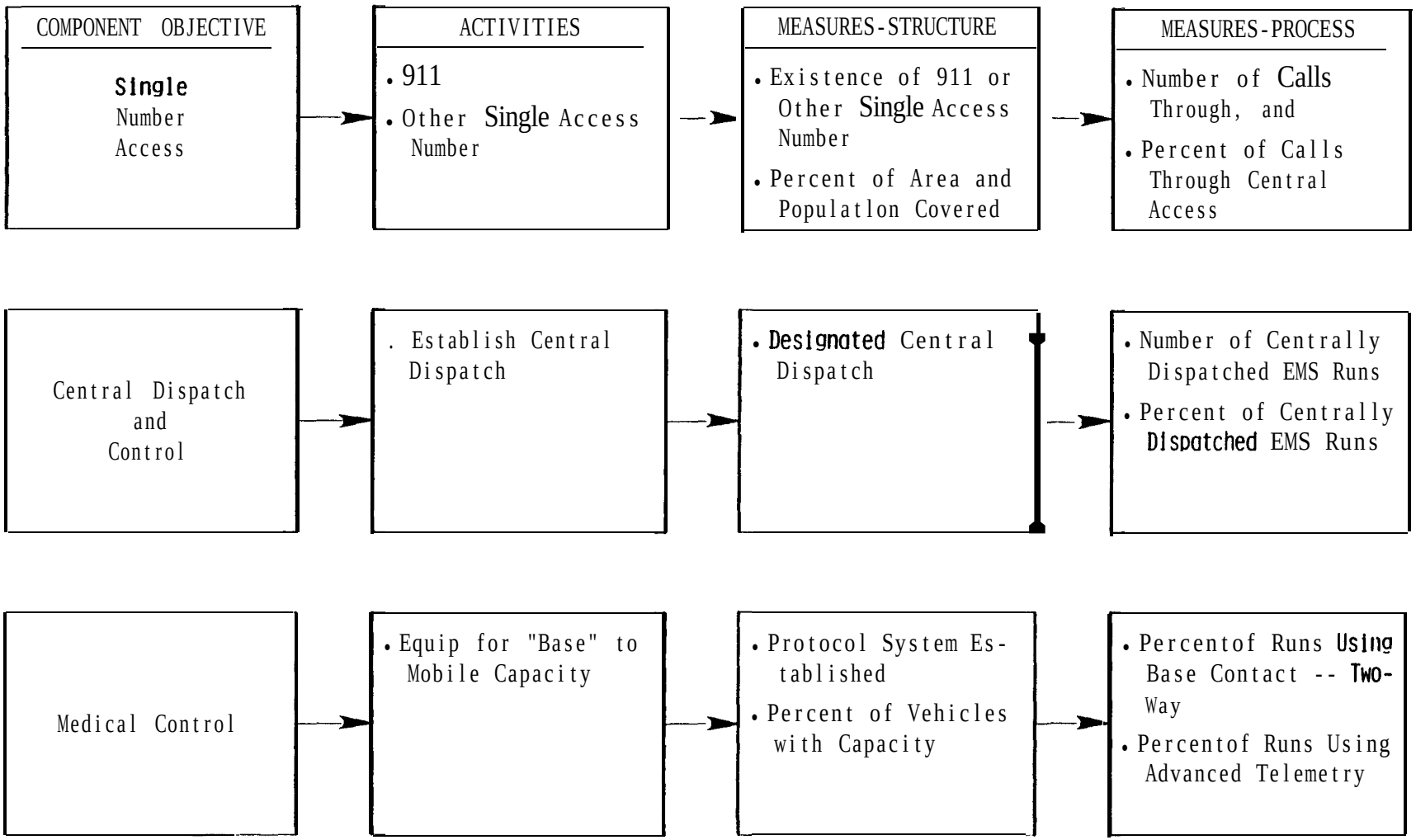
CATEGORIZATION

IMPACT MODEL



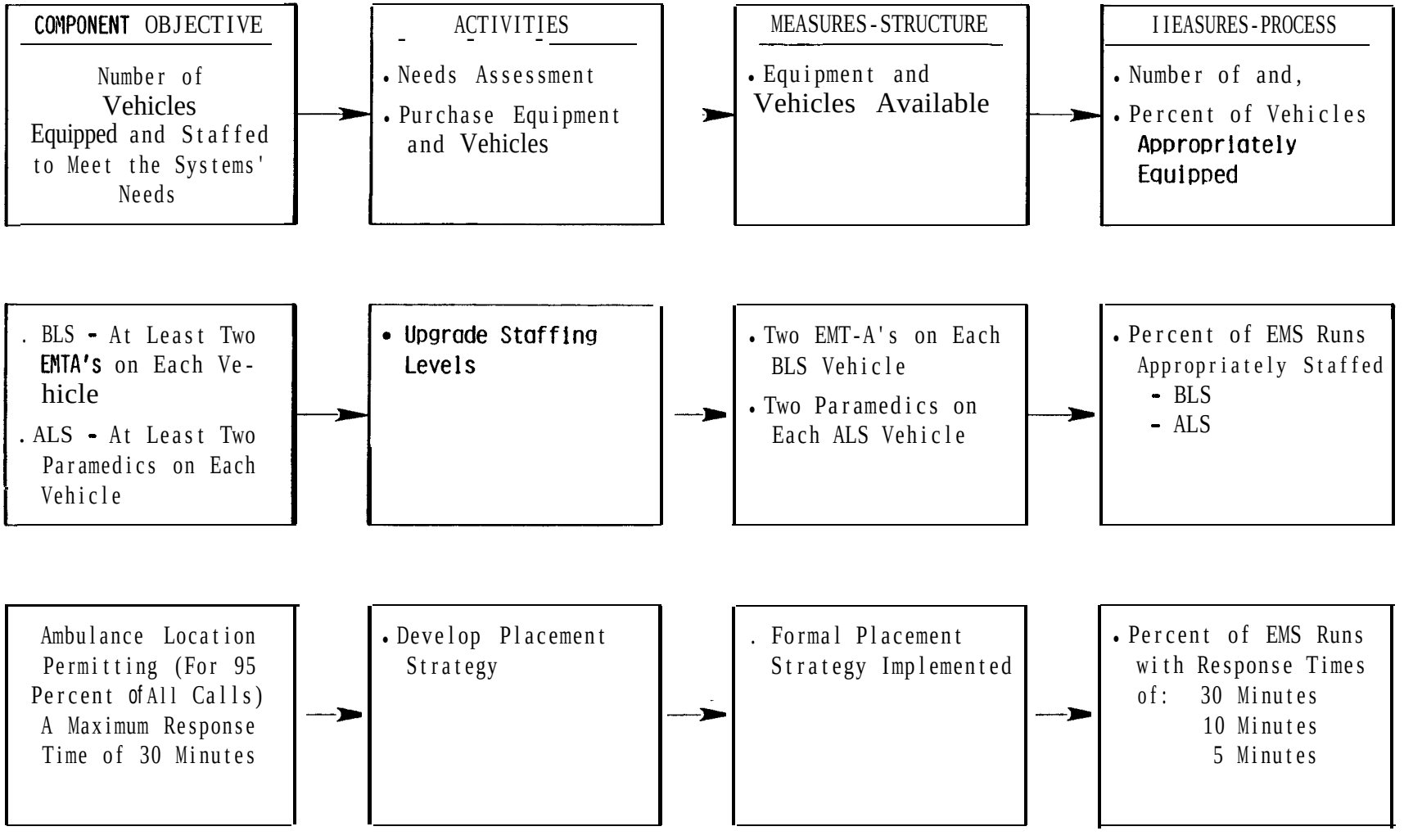
OEMS and Orange County Medical Association
Boyd, Illinois Trauma Program
Mullner and Goldberg, Illinois Trauma System
West, Trunkev, Lim, Orange and San Francisco Counties

COMPONENT: COMMUNICATIONS



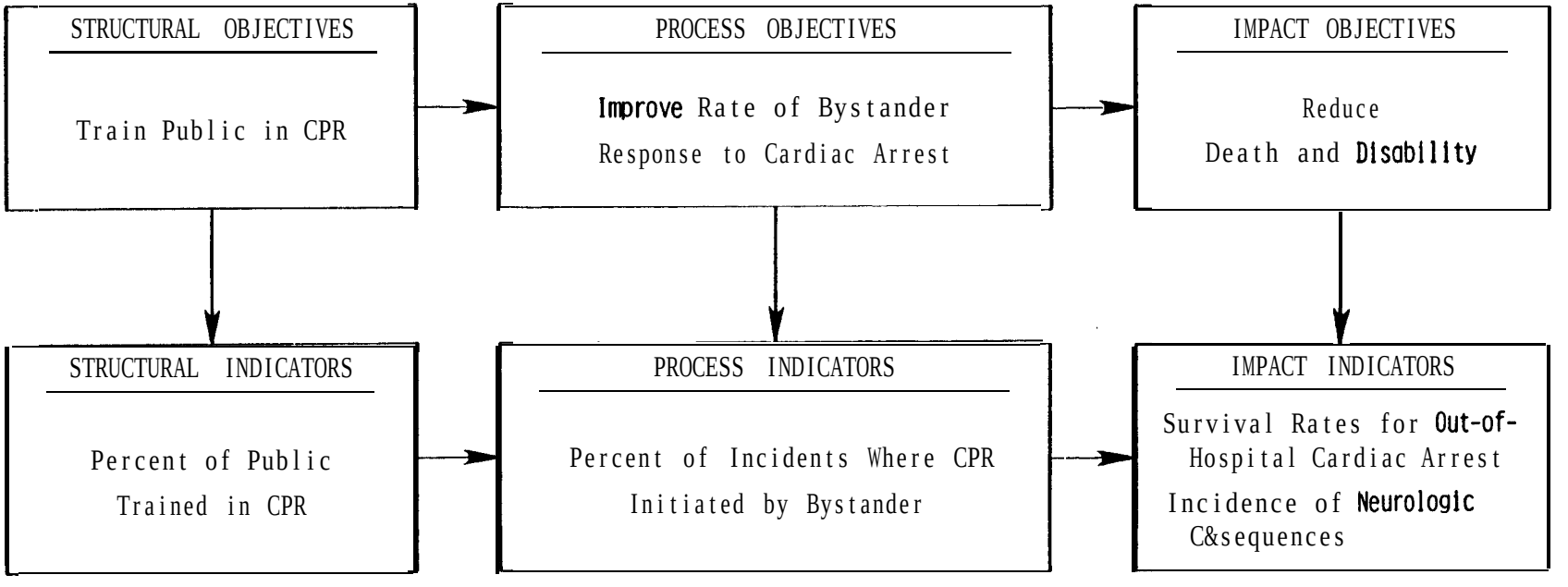
MEASUREMENT MODEL

COMPONENT: TRANSPORTATION



PUBLIC INFORMATION AND EDUCATION

IMPACT MODEL



Cobb, University of Washington

APPENDIX B

SITE VISIT REPORTS

SITE VISIT REPORT

On April 14 through April 17, 1980, System Sciences, Inc. team members visited the HHS Regional Office in Philadelphia, Pennsylvania and the Maryland Institute for Emergency Medical Services Systems (MIEMSS) in Baltimore, Maryland. System Sciences, Inc. was represented by Gerald Sparer, Katharine Robbins, Jane Morgenstern, and David Pedersen. Robert Stakes and Ed Yates of HHS attended and participated in the interviews.

While on site in Philadelphia and Baltimore, System Sciences, Inc. team members interviewed the following individuals:

Louis Donofrio	Regional Program Consultant, Philadelphia Regional Office
R.A. Cowley, MD	Director, MIEMSS
John Stafford, MD	Special Assistant to the Director
George Pelletier	Regional Coordinator and Coordinator of Region III
John Ashworth	Executive Director, Administration and Finance
William Hathaway	Executive Director, Field Programs
Alasdair Conn, MD	Medical Director, Field Programs
Deborah Buckmaster, RN	Assistant to Director of Nursing
Mark Moody, PhD	Chief, Program Evaluation
Greg Euzent	Evaluator
Kathy Peers	Evaluator
Alex Gretes	Executive Assistant to the Director
Ron Kropp	Chief, Planning and Development
Gary Oderda, PhD	Director, Maryland Poison Control Center
James Abate	Director, Pre-hospital Education Services and Director, Medical Education
Thomas Ducker, MD	Chief, Spinal Cord Center
Doctor Sperrozza, PhD	Director, Operations Research and Systems Analysis
Peggy Trimble	Assistant Director, Field Nursing Programs

The Maryland Emergency Medical Services System is comprised of four regions and serves 23 counties and one major metro area with a population of over four million and covering an area of over 10,000 square miles. Hospital care is provided by approximately 40 hospitals and pre-hospital care by certified profes-

sional and volunteer EMT's and CRT's. Control of the system is exercised by state government through MIEMSS. Maryland has graduated from the DEMS grant program and is considered a relatively complete emergency medical system.

The site visit was a pilot test of procedures to be used in the Evaluability Assessment of the DEMS program. Interviews were conducted with key MIEMSS personnel, supporting documents were collected, and hospital facilities were toured. Discussions focused on National, State and local goals and objectives and the functioning of the 15 program components and seven clinical areas required by DEMS.

LIST OF DOCUMENTS

Assorted Organizational Charts
MIEMSS Abstract
MIEMSS Status Report on the Impact of Maryland's Emergency Medical Services System on Victims of Injuries of the Seven Critical Care Classifications
MIEMSS Goals and Plans to Attain Those Goals
Esophogeal Obturator Airway and Mast Training Guidelines
Course Objectives for the Maryland Emergency Medical Technician Program, 1979
Poison Control Center Case Data Sheet
MIEMSS Clinical Programs Data Flow Chart
MIEMSS Monthly Activity Report, February, 1980
MIEMSS Evaluation for February, 1980
FY 80 Budget Projections: HSCRC and Variance, February 1980 Monthly Variance Charts
Chamber Committee Stats Input for February, 1980
MIEM Workload Study
MIEMSS at a Glance: First Quarter Summary, Fiscal 1980
Cardiac Consultation, April-October 1978, EMS Region III
Field Operations: Evaluation for First Quarter FY 80
Bypass Report, February 1980
MIEMSS Nursing Goals
MIEMSS Monthly Grants and Contracts Report, April 4, 1980
Ambulance Report Form
Emergency Management at an Airport Catastrophe, 1979
MIEMSS Public Information Pamphlet
Cowley, R.A. Collected Papers in Emergency Medical Services and Traumatology, 1979
1978-1979 Annual Report, MIEMSS
Maryland Emergency Medical Service Communications System, Final Design Report, March 1975
Continuing Education for Maryland Nurses -- Emergency and Critical Care, February 1980
MIEMSS Nursing Goals

SITE VISIT REPORT

On May 8 through May 16, 1980, System Sciences, Inc. team members visited the HHS Regional Office in San Francisco, California; Inland Counties Emergency Medical Authority (ICEMA) in San Bernardino, California; and the Orange County Emergency Medical System in Santa Ana, California. System Sciences, Inc. was represented by Gerald Sparer, Katharine Robbins, Jane Morgenstern, and David Pedersen.

While onsite in San Francisco and San Bernardino, System Sciences, Inc. team members interviewed the following individuals:

John Reilly	Regional Program Consultant, San Francisco Regional Office
Bridget Simone	Executive Director, ICEMA
Ben Hamilton	Communications Consultant
Charles Spickert	Manpower and Training Coordinator
Laura Barker	Medical Programs Coordinator
Vernon Lauridsen	Evaluation Specialist
Michael Guerin	Inland Counties Health Systems Agency Liaison to ICEMA
Dennis Wheeler, MD	Medical Director
Joseph G. Adatto, DO	Poison Consultant
Hazel Binder, RN	Critical Care Coordinator
Karen O'Keefe, RN	Advanced Life Support Coordinator
John Campbell	Field Coordinator
L.E. Mahoney, MD, Dr.PH	Vice Chairman, ICEMA Governing Board and Director of Health, San Bernardino County
J. Mullen, MD	Trauma Consultant
Al Lopez	Public Information Coordinator

The Inland Counties Emergency Medical Authority service region consists of a 40,480 square mile area encompassing four counties and 32 incorporated cities. Of the 1.5 million residents, 43 percent reside in the San Bernardino-Riverside metropolitan area. The remainder of the service area is characterized as rural to wilderness with widely distributed communities varying in size from a few hundred to over 100,000 residents. Winter and summer recreational activity in the northern and southeastern subareas result in 15-20 million visitor days

annually. Hospital care is provided by 37 hospitals and pre-hospital care by certified professional and volunteer paramedics and EMT-l's, Coordination of the system is exercised by the counties through ICEMA which is a free-standing division of local government created by a joint powers act. ICEMA is completing DEMS 1203-2 funding and will submit a 1204-l grant application.

While onsite in Santa Ana, System Sciences, Inc. team members interviewed the following individuals:

Mike Williams	Executive Director, Orange County EMS
Bob Heilig	Assistant Director
Gary Rotton	Ambulance Coordinator
Linda Paierog	Manpower and Training Coordinator
Kathy Higgins	Program Evaluation
Karl Gilbody, RN	Paramedic Coordinator
John West, MD	Trauma Consultant
William Thompson, MD	Critical Care Coordinator
Sylvia Micik, MD	Medical Director, San Diego Poison Control Center
Richard Cales, MD	-Medical Director, Orange County EMS
Charles Hanson	Emergency Communications Coordinator
David Schapiro, Pharm. D.	Director, Poison Control Center

The Orange County Emergency Medical System is the lead agency charged with the development and coordination of a comprehensive regional Emergency Medical Services System in Orange County, California. The region is a highly urbanized area with a population of 1.8 million located within 782 square miles. Hospital care is provided by 39 hospitals, 32 of which are designated as receiving facilities. Prehospital care is provided by professional paramedics employed by the Orange County Fire Department and patients are transported by private ambulance companies. Medical control is exercised in the field by six base station hospitals. Orange county has just completed designating five trauma centers, which will become operational June 8, 1980. Orange County EMS is a divison of the County Health Department. The program is completing DEMS 1203-2 funding and has submitted a 1204-l grant application.

The site visits to ICEMA and Orange County were part of the Evaluability Assessment of the DEMS program. Interviews were conducted with key personnel,

and supporting documents were collected. Discussions focused on National, State and local goals and objectives and the functioning of the 15 program components and seven clinical areas required by DEMS.

LIST OF DOCUMENTS

INLAND COUNTIES EMERGENCY MEDICAL AUTHORITY

ICEMA Organizational Charts
ICEMA Public Information Package
ICEMA Budget 1979-1980
Proposal for Designation as a Level I Trauma Center, Loma Linda University
Loma Linda Medical Center Trauma Packet
Desert Hospital Level II Trauma Center Proposal
Riverside Community Hospital Level II Trauma Center Proposal
County of San Bernardino Advance Life Support Program, 1980
ICEMA DEMS Grant Award
San Bernardino County Medical Center Level I Trauma Center Proposal
ICEMA DEMS 1203-2 Grant Proposal, two volumes
San Bernardino Ambulance Ordinance
San Bernardino County Ambulance Rate Resolution
Riverside County Ambulance Ordinance
ICMA Region Skills Sheet
Barstow Fire Department Runsheet
MIC Hospital Report Form

ORANGE COUNTY EMERGENCY MEDICAL SYSTEM

West, John G.; Donald Trunkey, Robert Lim. "Systems of Trauma Care."
West, John G. "A Method for Evaluating Trauma Care" (unpublished)
Orange County Trauma Audit, 1979
Orange County Trauma System Care Study, 1979
Orange County Base Station Criteria
Program Statistics, Orange County Human Services Agency, Emergency Medical Services
Orange County Mobile Intensive Care Program Criteria
State of California Poison Control Center Standard
Ashcraft, Marie; et. al. "Expectations and Experience of HMO Enrollees After One Year."
Request for Proposal: by Prospective Hospitals for Designation as Trauma Service Centers
Program Statistics - Orange County Human Services Agency, EMS
EMS/Dispatcher: Definition, Responsibilities, Skills
EMS/Dispatcher Training
EMS/Dispatcher: Training RFP
Emergency Department Nurse Training Program
Emergency Department Nurse Assessment: Task Force Recommendations

SITE VISIT REPORT

On June 9 through June 13, 1980, System Sciences, Inc. team members visited the HHS Regional Office in Atlanta, Georgia; West Alabama Emergency Medical Services System in Tuscaloosa, Alabama; Birmingham Regional Emergency Medical Services System in Birmingham, Alabama; South Eastern Alabama Emergency Medical Services System in Montgomery, Alabama; and the Alabama State EMS Office located in Montgomery. System Sciences, Inc. was represented by Gerald Sparer, Katharine Robbins, Jane Morgenstern, and David Pedersen.

While on site in Atlanta and Tuscaloosa, System Sciences, Inc. team members interviewed the following individuals:

Algie Jordon	Acting Director, Region IV EMS
James T. Lovett	Deputy Regional Director, HHS
Nellene Auston	Grants Management Specialist, HHS Regional Office
Phillip Bobo, MD	Medical Director, West Alabama EMS, Inc.
Richard Looser	Project Coordinator, West Alabama EMS, Inc.
Peggy King	Critical Care Coordinator
Don Meissner	Public Information and Education Coordinator, Communications Coordinator

West Alabama EMS, Inc. (WAEMS) is a service region made up of seven counties. It is a non-profit cooperation that contracts with the State of Alabama to provide emergency medical service coordination in its seven-county area. WAEMS has graduated from the DEMS grant program, having completed 1204(2) funding in Fiscal Year 1978. It currently receives funds from the State of Alabama and local governments and agencies.

While on site in Birmingham, System Sciences, Inc. team members interviewed the following individuals:

Ray Wade	Project Coordinator, Birmingham Regional Emergency Medical Services System
Susan Reynolds	Administrative Assistant
Richard Ransom, MD	Medical Director
George Saunders, D. Pharm.	Director, Poison Control Center
Allen Dimick, MD	Burn Consultant, State EMS Medical Director

The Birmingham Regional EMS System (BREMSS) is comprised of a six-county area in North Central Alabama covering 4,586 square miles and a population currently projected at 874,000. Approximately 71 percent of the population lives in the B'irmingham Metropolitan Area. BREMSS is a division of the University of Alabama at Birmingham and contracts with the State of Alabama to provide EMS coordination services in its region. BREMSS is presently completing 1203(2) funding and has applied for a 1204(1) grant.

While on site in Montgomery, System Sciences, Inc. team members interviewed the following individuals:

C. Doyle Haynes, MD	Medical Director, South Eastern Alabama EMS, Inc.
James Chalkley	Project Coordinator
Ann Mayne	Clinical Care Coordinator
Denise Smith	Grants Management
Sue Lovies	Training Coordinator
Patricia McMahon	Public Information and Education
Rodney Dorand, MD	Neonate Consultant
Art Harmon	Director, Alabama State EMS Office
Sonny Adams	Assistant Director
Kemper Franklin	Grants Management and Evaluation

Southeast Alabama Emergency Medical Services, Inc. is a private, non-profit corporation that contracts with the state to provide support services for EMS in the Southeast region of Alabama. SAEMS serves an 18-county area. It has just completed 1203(2) funds and has applied for assistance under section 1204(1) of the EMS Act.

The Alabama State EMS Office is located in Montgomery and is the lead EMS agency in Alabama. It also is the prime grantee to DEMSS and handles most grant management activities for the regions receiving federal funds.

These site visits were part of the Evaluability Assessment of the DEMS program. Interviews were conducted with key personnel and supporting documents wereobtained. Discussions focused on National, State and local goals and objectives and the functioning of the 15 program components and 7 clinical areas required by DEMS.

LIST OF DOCUMENTS

ATLANTA REGIONAL OFFICE

Federal Program Resources Guide for Emergency Medical Services Systems

Regional Office EMS Review Process, Fiscal 1980

Region IV EMS Review Schedule -- April 21-25, 1980

Emergency Medical Services Status Report, June 1974

1975 Grants Emergency Medical Services System Act, Region IV

1976 Grants, Emergency Medical Services Systems Act, Region IV

Fiscal 1977 EMS Grant Awards, Region IV

Fiscal 1978 EMS Grant Awards, Region IV

Fiscal 1979 EMS Grant Awards, REgion IV

WEST ALABAMA EMERGENCY MEDICAL SERVICES, INC.

West Alabama EMS Activities Report, April 1, 1980

Officer Ugg Newsletter, June 1980

Financial Status Report, Form PHS-5154

Tuscalloosa County 911 Dispatch Center Report

West Alabama EMS Ambulance Run Report Form

West Alabama EMS Emergency Room Outpatient Report Form

West Alabama EMS Public Information and Education Packet:

- Officer Ugg stickers
- Drug Abuse in West Alabama (Pamphlet)
- She Didn't Know It Was Poison (Flyer)
- Life Saving Services for West Alabama (Flyer)
- List of Materials Available from West Alabama EMS
- Tuscaloosa News. "Emergency Medical Services."
- Rapid Responder Handbook
- Safety Poster

BIRMINGHAM REGIONAL EMERGENCY MEDICAL SERVICES SYSTEM

BREMSS Quarterly Report, January through March 1980. Two volumes

Matrix for Vertical Categorization of Hospitals within BREMSS Region

Categorization Guidelines

Selected chapters from BREMSS 1204 Grant Proposal

BREMSS Emergency Medical Report

Evaluation Study of BREMSS Public Information and Education Program. Written by Joan Reeds, PI & E Coordinator

SOUTHEAST ALABAMA EMS COUNCIL, INC.

Montgomery Fire Department Emergency Medical Report Form

Emergency Medical Services in Southeast Alabama (Flyer)

Emergency Dispatch. January-March 1980.

EMS Rules, Regulation, and Standards

Letter from Arthur Haraman to Ernest Williams regarding equipment purchases

Alabama EMS Program: Comments About Transfer Agreements

Notice of Deficiencies, Division of Emergency Medical Services, Ambulance Vehicle/Equipment Inspection Report

STATE OF ALABAMA HEALTH DEPARTMENT EMS PROGRAM

Application for Ambulance Service Operator License

Quarterly Performance Report for State of Alabama, November 27, 1978

State of Alabama Ambulance Regulation Act of 1971

Application for State of Alabama Coordination of EMS. March 1980

APPENDIX C

EMERGENCY MEDICAL SERVICES

FUNDING HISTORY -- 1974-l 979

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT											
	1202(A)		1202(B)		1203(1)		1203(2)		1204(1)		1204(2)	
	Year	Amount*	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount
ALABAMA												
State Department of Health	1975	159			1975	158	1976	189				
West Alabama EMS	1974	41			1977	247	1978	257	1979	280		
Birmingham Regional EMS			1979	30	1977	247	1978	257	1977	296	1978	426
East Alabama EMS					1979	370						
Southeast Alabama EMS					1977	246	1979	370				
Southwest Alabama EMS	1978	60										
ALASKA												
State Department of Health					1975	450	1976	725				
Northern Regional EMS	1978	75	1979	80								
Southern Region EMS	1978	75			1979	625						
Southeastern Alaska EMS					1977	698	1978	721				
ARIZONA												
State Department of Health												
Region I -- Phoenix	1975	45			1977	645	1978	450	1979	388		
Region II -- Tucson	1978	60										
Region III - Flagstaff	1974	32			1977	370	1978	425	1979	388		
Region IV - Kenyman												
Region V - Navaho Reservation									1974	519	1976	189
ARKANSAS												
Region I -- Fayetteville												
Region II - Batesville												
Region III - Jonesboro												
Region IV - Fort Smith												
Region V - Hot Springs												
Region VI - Little Rock												
Region VII - Terorkoma												
Region VIII - Pine Bluff												
CALIFORNIA												
Region I -- Eureka					1976	521						
Region II -- Redding	1975	45										
Region III -- Sacramento	1974	44			1975	400	1976	664	1978	450	1979	445
Region IV -- Sonoma												
Region V -- San Mateo County									1978	250		
Region VI -- East Bay EMS					1974	666			1978	450		
Region VII -- Santa Clara EMS					1977	521						
Region VIII -- Stockton	1974	45										
Region IX -- Fresno		45										
Region XI -- Santa Barbara	1975	45										
Region XII -- Los Angeles									1974	2,130	1975'	499
Region XIII -- Santa Ana	1977	60			1978	375	1979	576				
Region XIV -- San Diego									1974	346	1975	1,241
Region XV -- Inland Counties	1974	39	1979	30	1977	477	1979	526				
Bay Area CHP	1974	67			1975	450	1976	1,004				
City of San Francisco					1974	381						
City of Norcoa	1974	32										
North Coast CHP					1975	181			1978	300	1979	289
North California EMS					1975	400	1976	649				

* Amount in thousands of dollars.

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT											
	1202(A)		1202(B)		1203(1)		1203(2)		1204(1)		1204(2)	
	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount
COLORADO												
Region 1A -- Northwest COG												
Region 1B --												
Region 2 -- Pueblo					1979	490	1974			207		
Region 3 -- Grand Junction					1974	237	1978	369				
Region 4 -- Loveland-Ft. Collins									1979	256		
Region 5 -- Colo. Sp.-Fairplay					1978	341						
State Department of Health	1974	76			1975	456	1976	301	1975	144		
"Regions" 4, 6, 13	1975	107			1977	601			1976			
*Regions" 2 7, 8,									1977	206 188		
CONNECTICUT												
Southwestern EMS												
Southcentral EMS					1975	250	1979	325				
Eastern EMS					1977	400	1978	309				
Northcentral EMS					1978	200	1979	275				
Northwestern EMS					1976	450	1979			350		
State Department of Health	1974	135										
DELAWARE												
Statewide EMS	1975	60	1979	30	1977	181	1978	219				
DISTRICT OF COLUMBIA												
Metro Area EMS	1974	45			1975	800	1976	1,100	1978	536	1979	354
FLORIDA												
Florida Panhandle EMS									1977	430	1979	620
Region II -- Gainesville												
Region III -- Jacksonville												
Region IV -- Tampa Bay-St. Pete												
East Central Florida REMSCO			1979	30	1978	521						
Region VI -- Fort Myers												
Region VII -- Stuart												
Region VIII -- Pompano Beach												
Region IX -- Miami												
State Department of Health	1974	45			1975	348	1976	535	1974	53	1975	93
GEORGIA												
Region I -- NW Georgia Reg. Hosp.												
Region II -- Hall County												
Region III - Atlanta					1974	213	1976	151				
Region IV -- Troup County		60										
Region VI -- Laurens County EMS	1978	28			1978	417						
Region VII -- Columbus	1977	34			1979	510						
Region VIII - SW Health Dist.					1977	354						
Region IX -- Coastal Health Unit	1979	60										
Region X -- Northeast Ga. EMS	1977	28			1978	417	1979	750				
State Department of Health	1975	91										
HAWAII												
Statewide EMS	1975	86			1974	747	1975	311	1976	653	1977	785

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT					
	1202(A)	1202(B)	1203(1)	1203(2)	1204(1)	1204(2)
	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount
-- Coeur D'alene					979 405	
-- Boise					977 785	
Department of Health			1975 250	1976 434	975 450	1976 674
S						
Ia -- Rockford	1974 40					
Ib -- Peoria					977 600	
-- Chicago Suburbs						
Ia -- Jackson.-Spring.					979 450	
IIIb -- Champaign						
IV -- Bellville						
V -- Marion						
VI -- City of Chicago					975 1,400	1976 1,035
Department of Health					975 1,697	
stern Indiana EMS	1975 44		1977 450	1978 400	979 425	
Indiana EMS	1977 58		1978 300	1979 500		
n Indiana EMS	1975 45					
Department of Health						
IX" -- Columbus	1974 45					
te Area HPC	1975 41					
st Iowa EMS						
akes EMS	1975 45		1977 300	1978 45		
III -- Trinty Reg. Hosp.						
Iowa EMS			1979 450			
st Iowa EMS			1978 400	1979 690		
IS (Omaha-Co. Bluff)			1978 653			
IS	1978 60					
epartment of Health	1975 43					
	1977 150					
ion I -- Colly-Hosp.			1979 460			
ion II -- Garden City			1979 460			
ion III -- Coffeyville						
ion IV -- Topeka						
st Missouri EMS						
rican Regional Council			1975 391	1976 447		
epartment of Health	1975 224		1977 375			
Y						
-- Purchase EMS						
-- Pennyrile EMS						
III -- Green River EMS						
IV -- Barren River EMS			1976 208		1977 333	1979 370
V -- Emergency Five EMS			1976 208		1979 318	
VI --korthern Ky EMS						
VII -- Lexington			1977 165			
VIII -- Lake Cumberland EMS			1976 208		1977 333	1978 947
IX -- FIVCO EMS			1978 169			
epartment of Health	1974 45		1974 2,297			

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT											
	1202(A)		1202(B)		1203(1)		1203(2)		1204(1)		1204(2)	
	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount
LOUISIANA		45										
Southeast Louisiana EMS	1974	44			1978	150	1979	299				
Region II -- Baton Rouge	1975											
Region III -- Thibodaux					1978	150						
Acadiana EMS					1978	250	1979	300				
Southwest Louisiana EMA	1979	60										
legion VI -- Alexandria	1978	300										
Region VII -- EMS Foundation					1978	300	1979	299				
Northeast Louisiana EMS	1978	300			1979	275						
State Department of Health	1977	50			1977	250						
MAINE												
Region I -- Portland					1977	400	1978	300	1979	300		
iegion II -- Tri-County EMS					1977	300	1979	300				
Region III -- Kennibec EMS					1976	324			1977	400	1978	350
iegion IV -- Downeast& EMVTI EMS					1979	300						
State Department of Health	1975	271			1975	250						
Region V -- Preque Isle EMS					1978	200	1979	300				
City of Portland, Maine									1974	189		
MARYLAND												
RegionI -- Cumberland												
iegion II -- Hagerstown												
Region III -- Baltimore					1976	580			1975	400	1976	527
iegion IV -- Eastern Shore	1974	41							1978	262	1979	321
iegion V -- D.C. Metro Suburbs											1978	523
YIEMSS					1975	456						
YASSACHUSETTS												
Region I EMS Committee												
Central Massachusetts EMS					1977	150			1978	405		
Region III -- Bon Secours Hosp.			1979	30								
Metropolitan Boston EMS					1977	150			1979	425		
Region V -- Brochton					1977	150						
Region VI -- Cope & Islands EMS			1979	30								
State Department of Health					1974	1,889	1975	500	1976	1,226		
					1976	500						
YICHIGAN												
Southeastern Michigan EMS	1974	45			1977	834	1978	500	1979	500		
Michigan Mid-South EMS	1978	108										
Southwest Michigan EMS							1979	550				
West Michigan EMS	1974	45			1978	425			1978	325	1979	350
Region V - GLS Health Systems					1974	200						
East Central Michigan HSA					1975	220	1977	400	1978	300		
Northern Michigan HSA	1974	45										
Region VIII - Marquette												
State Department of Health					1975	80	1976	901				
City of Port Herron									1974	40		
MINNESOTA												
Region I - Agassiz Health Coun.												
Arrowhead Regional EMS					1979	650						
Region III - Moorhead												
Central Health Systems Agency												
Metro St. Paul-Minneapolis					1978	525						
Southeastern HSA												
State Department of Health					1977	1,021						
HSA-6	1979	60										

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT					
	1202(A)	1202(B)	1203(1)	1203(2)	1204(1)	1204(2)
	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount
SIPPI						
I - Clarksdale	1975 23				1979 560	
Miss. EMS Authority	1975 23		1975 383			
III - Jackson\						
ast Air Ambulance			1974 452		1977 323	
est Miss. EMS		979 30	1978 290			
Department of Health	1974 45		1976 607			
	1975 23					
RI						
est Missouri EMS		979 30	1978 302			
ast-Northcentral EMS			1978 343			
erica Regional	1974 35					
1 EMS Council	1974 44		1979 400			
st Gateway	1974 45					
est Missouri EMS			1978 359			
.I - Cape Girardeau						
Department of Health	1975 319		1977 550			
'IA - Great Falls	1974 15				1978 379	
IB -	1974 22		1975 270	979 556		
2A - Billings			1977 325	979 270		
III	1974 9		1975 180			
lepartment of Health	1975		1975 45	976 430	1975 144	
'A						
·le EMS						
ains EMS						
ebraska EMS						
n Nebraska EMS			1978 538			
st EMS			1979 660			
s EMS (MAPA)	1974 42					
VII - Northeast IA EMS						
epartment of Health	1974 45		1975 1,237	976 1,547	1977 500	
			1977 375			
I - Carson City						
II - Elko						
III - Tonopah			1977 501	978 300	1979 286	
IV - Los Vegas						
epartment of Health	1975 79					
SHIRE						
I - Hanover			1976 185			
II - Manchester	1978 70					
III - Please AFB	1974 45				1977 400	
IV -*Carroll County						
/ - Littleton					1978 350	
epartment of Health	1975 45		1975 250			
County			1979 200			
Regions I & V	1979 45					
Regions II & IV	1979 45					
IEY						
e EMS	1975 235		1977 900	978 838		

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT					
	1202(A)	1202(B)	1203(1)	1203(2)	1204(1)	1204(2)
	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount
NEW MEXICO						
Northern New Mexico EMS			1978 365	1979 310		
Region II - Los Cruces			1979 295			
Region III - Rosewell						
State Department of Health	1977 120					
NEW YORK						
Region I - Lake Country	1974 45		1975 375	1976 460		
Region II - Empire 9 EMS	1974 44		1975 375	1976 366		
Central New York Hosp. Assoc..	1975 45		1978 350	1979 550		
Region IV - Binghamton						
Region V - Saratoga						
Region VI - Westchester	1974 45		1976 435		979 420	
NYC Health & Hosp. Corp.	1975 274		1977 995	1979 800		
				1978 825		
Region VIII - Long Is.-Nassau			1976 390			
State Bureau of EHS	1974 44					
NORTH CAROLINA						
Western NC EMS	1977 40		1978 412			
Piedmont Triad EMS			1978 412	1979 410		
Centralina COG - EMS Proj.			1977 306			
Kerr-Tar COG - EMS Proj.	1977 40		1979 330			
Region V - Wilmington						
Region VI - Greenville	1977 40					
	1974 38					
State Department of Health						
NORTH DAKOTA						
Region I - Bismark						
Region II - Williston						
Region III - Grand Forks						
Region IV - Fargo						
State Department of Health					1974 468	1975 1,000
OHIO						
Region I - Cincinnati	1974 44					
Western Ohio EMS			1977 500	1978 650		
West Central Ohio HSA	1979 65					
	1975 45					
Region IV - Toledo			1974 1,200		976 1,134	1978 300
Region V - Columbus						
Region VI - Zanesville						
Northeastern Central EMS	1974 44		1975 500	1979 345		
Region VIII - Akron	1975 44					
Cleveland EMS			1975 500	1976 701	977 400	1978 365
Region X - Youngstown	1975 45					
State Department of Health						
OKLAHOMA						
Region I - McAlester						
Region II - Lowton			1978 365	1979 330		
Region III - Enid						
Region IV - Tulsa						
Region V - Oklahoma City						
State Department of Health	1974 65		1975 348	1977 440		

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT											
	1202(A)		1202(B)		1203(1)		1203(2)		1204(1)		1204(2)	
	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount
OREGON												
Region I - Portland	1975	44			1977	502	1978	533	1979	631		
Region II - Eugene	1974	20							1978	349		
Region III - Bend	1974	18							1978	349		
State Department of Health	1974	23	1979	30	1975	739	1976	950	1976	120		
Umpque County					1974	132						
dheeler County					1974	30						
Central Oregon Inter-Governmental Council					1974	217						
PENNSYLVANIA												
Region I - Erie					1978	257	1979	274				
Region II - Pittsburg			1979	40	1975	500	1976	575	1978	400		
Southern Alleghany EMS	1975	45										
Region IV - SEDA-COG					1979	215						
New York-Penn. HSA												
EMS of Northeastern Pa.	1975	45			1978	301						
Eastern Pa. EMS	1975	45			1979	265						
Southeastern Pa. Emergency	1974	45			1978	414						
EMS Fed. of South Central Pa.					1978	375	1979	389				
State Department of Health	1977	130										
PUERTO RICO												
Commonwealth EMS			1979	120	1975	375	1976	375				
RHODE ISLAND												
Statewide EMS					1975	250	1977	450	1978	250		
SOUTH CAROLINA												
Region I - Greenville									1978	222	1979	460
Midlands EMS Region					1976	526	1977	398	1978	387	1979	460
Pee Dee EMS Region	1979	60										
Region IV - Charleston					1978	373	1979	340				
State Department of Health	1974	45			1975	633						
SOUTH DAKOTA												
Region I - Huron	1974	49										
Region II - Rapid City												
State Department of Health	1974	51			1975	556	1976	714				
TENNESSEE												
1st Tenn. Reg. Health Office	1975	38										
East Enn. Region Health Office	1975	38			1977	392						
Region III - Ga.-Tenn. Reg.	1974	45										
Region IV - Nashville												
Southwest Reg. Health Office					1978	414						
Memphis Delta Reg. Health Off.	1975	38										
State Department of Health												

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT					
	1202(A)	1202(B)	1203(1)	1203(2)	1204(1)	1204(2)
	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount	Year Amount
TEXAS						
Region I - Amarillo			1975 318	1976 500	1977 350	1978 262
South Plains EMS			1979 240			
Region III - Wichita Falls						
North Central Texas COG			1975 267	1976 529	1977 385	1978 250
Arkansas-Texas COG			1978 274			
Region VI - Tyler			1978 274	1979 290	1978 235	
West Central Texas EMS			1974 144	1978 2,745		
Region 8 - El Paso						
Region 9 - Odessa			1975 328	1976 500	1977 210	1978 227
Region 10 - San Angelo						
Region 11 - Waco						
Capital Area EMS Planning						
Region 13 - Bayan						
Region 14 - Lufkin						
Region 15 - Beaumont						
Region 16 - Houston						
Region 17 - Victoria						
Region 18 - San Antonio					1974 333	1975 500
Region 19 - Laredo						
Region 20 - Corpus Christi						
Region 21 - Harlingen						
Region 22 - Sherman						
Central Texas COG			1978 274	1979 290		
Region 24 - Uvalde						
State Department of Health	1975 400 1974 95		1977 1,250	1976 580		
Brosos Valley Devel. Council			1974 163	1975 117		
UTAH						
Statewide EMS			1976 713		1977 568	
Region I - Salt Lake City					1978 324	1979 362
VERMONT						
Region I - Burlington			1979 150			
Region II - North Country			1979 150			
Region III - Springfield		1979 30	1977 275	1978 162		
Region IV - Rectland		1979 30	1977 275	1978 162		
Region V - Montpelier						
State Department of Health	1974 45		1975 250	1976 300		
VIRGIN ISLANDS						
Territory EMS	1978 60		1979 380			
VIRGINIA						
Region I - Charlottesville	1975 30		1975 315	1976 434	1977 294	1979 197
Region II - DC METRO			1976 1,100			
Lynchburg-West Va. EMS	1974 28	1979 45	1977 613	1978 228 239		
Region IV - Richmond	1975 45					
Peninsulas EMS	1975 70		1978 231	1979 372		
Tidewater EMS			1975 324	1976 398	1977 251	1979 286
Southwest Va. EMS	1979 45					
State Department of Health	1975 122					
Rapphanoch Region	1977 20					
Va. Fed. of EMS Councils	1978 20		1978 283			
	1979 20		1979 164			
			1979 157			

EMERGENCY MEDICAL SERVICES

Funding History -- 1974 - 1979

EMS REGIONS BY STATE	SECTION OF EMS ACT											
	1202(A)		1202(B)		1203(1)		1203(2)		1204(1)		1204(2)	
	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount
WASHINGTON												
Region I - Spokane									1977	231		
Region II - Olympia	1974	26			1974	87	1975	99	1977	231		
Region III - Bellingham					1977	167			1978	701		
Region IV - Kelso	1974	24			1974	172						
North Central EMS									1977	231		
Region VI - Silverdale-Bermeston					1978	272			1979	250		
King County EMS					1977	167	1978	272	1979	250		
Region VIII - Yakima					1977	167	1978	272	1979	250		
State Department of Health	1975	156			1974	527			1976	802		
WEST VIRGINIA												
Region I - WRMS EMS												
Appalachia EMS	1975	45			1977	231	1978	332				
Region III - EMSOR, Inc.	1975	45			1979	180	1978	242				
Mid-Ohio Valley					1979	356						
Region V EMS	1974	45			1975	320	1976	350	1979	440		
Northeastern EMS									1977	124		
Northern WV EMS	1974	38							1977	124		
State Department of Health	1975	45										
WISCONSIN												
		45										
Region I - Madison HSA	1975	62										
Region III	1978	120										
Northeast Wisconsin EMS	1975	45			1977	480	1978	300	1979	400		
Western Wisconsin HSA	1979	56										
North Central Area	1975	34										
Northwest Wisconsin EMS	1977	45			1978	175	1979	455				
State Department of Health												
WYOMING												
Statewide EMS	1977	84			1975	300	1976	370				
							1977	413				
							1978	388				
							1979	420				

APPENDIX D

DEFINITIONS FOR FUNDING PROFILES

The columns on Exhibit I are defined as follows:

- Column A -- DEMS -- All Title XII funds received during the current operating year. Specify under which Section (1202, 1203, 1204, etc.) funding was granted.

- Column B -- BHP -- All Title VII training funds received from the Bureau of Health Professions during the current operating year.

- Column C -- DOT -- All DOT Title 402 funds received by local jurisdictions in the EMS project area during the current operating year.

- Column D -- State -- All funds received from agencies of state government during the current operating year.

- Column E -- Local -- All funds received from local sources such as, county and city governments, councils of governments, sub-state planning districts, public safety agencies, and other community based organizations that help support the operations of the EMS project. Income generated by the project, through fees, contracts, fund raising activities, or other means should also be included.

- Column F -- Other -- All other sources of funding not covered in Columns A-E. Specify the source.

- Column G -- Total -- The sum of columns A-F.

Rows for Exhibit I are defined as follows:

- Administration -- All costs associated with general administrative and clerical activities, including all activities related to evaluation, record keeping, planning and public information.

  Personnel -- All salary and benefits received by project employees working on the above activities.

  Other -- All non-personnel costs including contracts, supplies, equipment, rent, etc.

- Communications -- All costs associated with the installation, operation, and maintenance of the EMS communications system. Include only costs associated with a single access telephone system that will be paid from EMS project funds.

Personnel -- Salary and benefits paid to project personnel.

Equipment -- All communications related equipment

Other -- All other costs related to communications such as: consulting fees, contracts, supplies, and facility changes.

0 Categorization -- All costs associated with the categorization of EMS patient care.

Personnel -- All salary and benefit costs of project staff working in activities related to categorization.

Contracts -- All contractual costs incurred through the use of consultants, facilities, or services related to categorization.

Other -- All other costs related to categorization.

o Training -- All costs associated with certifying and monitoring EMS personnel.

Personnel -- Salary and benefit costs of project staff (i.e., Training Coordinator) related to training.

Contracts -- All contractual costs incurred through the use of consultants, facilities, or services related to training.

Other -- All other training costs.

o Ambulance -- All costs related to the operation and coordination of the pre-hospital care system.

Personnel -- Salary and benefits costs of project staff (i.e., EMT Coordinator) and rescue teams if they are paid from project funds.

Equipment -- All vehicles, supplies, and equipment purchased for use by paramedics or EMT's.

Other -- All other pre-hospital costs.

o Aggregate -- The sum of all categories for the following:

Personnel
Equipment
Contracts
Other

If a project staff member is substantively involved in several categories, his or her personnel costs may be distributed among each of the categories, or it may be allocated to the one category where that person spends the majority of his or her time and efforts.

For each calendar year of operation, provide the following funding information in thousands of dollars:

- o PHS-DEMS -- All Title XII funds. Specify under what Section (1202, 1203, 1204, etc.) funding was granted.
- o BHP -- All Title VII funds received from the Bureau of Health Professions.
- o DOT -- All DOT Title 402 funds received by local jurisdictions in the EMS project area.
- o Total Federal -- The sum of the above sources.
- 0 State -- All funds received from agencies of state government.
- 0 Local -- All funds received from local sources such as: city and county governments, sub-state planning districts, public safety agencies, and other community-based organizations that help support the EMS project. Self-generated income from fees, contracts, special tax levies, fund raising activities, and other means should also be included.
- o Other -- All other income not covered in one of the above categories.
- o Total Non-Federal -- The sum of state, local and other support.
- o Grand Total -- The sum of Federal and Non-Federal income.